The Iron Age

A Review of the Hardware and Metal Trades.

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The Lurmann Closed Hearth System.

We show in the accompanying illustrations the details of the Lurmann Closed Hearth System of blast furnace construction, for which we are indebted to *The Engineer*:

The drawing shows a horizontal and a vertical section of a blast furnace hearth, also elevations of the tapping hole and of the scoria outlet arrangements, part of the latter being drawn on a larger scale. The hearth is circular, having no fore-part or fore-hearth. Of the seven tuyeres shown only four are to be used regularly; the three others serve as reserve tuyeres, and have to be used for the adjacent tuyeres in case the blast has to be taken off the main tuyeres. The tuyere over the tapping hole should be used only when the tapping hole is long.

The scoria outlet is placed in this drawing at the back of the furnace, but may, of course, be placed wherever it is most convenient. It is, however, M. Lurmann maintains, not practical to place the tapping hole and the scoria hole close together, as thereby both holes become less accessible, and the work to be done becomes more difficult. Neither would it be so easy to keep the surroundings of them neat and clean. If, therefore, it be possible to draw the slag at the side or the back of the furnace, it should be done, as then the working of the slagging hole will not interfere with that of the tapping hole. The scoria block is placed 2 ft. 10 in. from the bottom of the hearth, and 1 ft. 3 in. below the center of the tuyeres. As stated before, these dimensions have given good results, and should be adhered to. The opening in the wall of the hearth for the slagging arrangement is 20 in. by 27½ in., with plain cast iron plates C at the top. In this opening a plate box A, called the scoria plate, is placed, the back of which is flush with the inside wall of the hearth. The scoria plate measures 25 in. by 16¾ in.; it may, therefore, when necessary, be easily exchanged, as the opening in the wall is 2½ in. higher and 3¼ in. wider. The space left between them is carefully filled up with fire bricks.

In the scoria plate a circular opening for the scoria block is left, over which a slot bar is fastened by means of two screws. These are made of brass to avoid their being rusted in. They can easily and quickly be taken out by means of a box spanner with a long handle. A strong wrought iron drop key in this slot bar holds the scoria plate in its proper position. Beside the round hole for the scoria block, there is in the scoria plate another opening 4½ in. by 2¾ in., which is in ordinary working closed with clay. Through this opening the slag is drawn, when for some reason or other it will not flow through the scoria block. This opening is also useful for facilitating the exchange of the scoria block by inserting a bar with a hook at the end, by means of which the block is pulled out, after the drop key has been removed.

The scoria plate A weighs about 6 cwt., and costs about £6. The scoria block B is made of bronze, like the blast tuyeres. It is claimed that such scoria blocks are more durable than if made of cast or wrought iron, being more effectually cooled by the water. They are also cheaper than the cast iron ones. The latter weigh about 150 lbs., and cost about 30/ each; when old they fetch about 4/, so that the actual cost of each block is 26/. The bronze blocks weigh about 25 lbs., and cost about 41/, 1/8 per lb.; when old they will realize about 25/, 1/ per lb., the actual cost being therefore only 16/ for the more durable block. The scoria block has, like the blast tuyeres, wrought iron inlet and outlet pipes screwed into it.

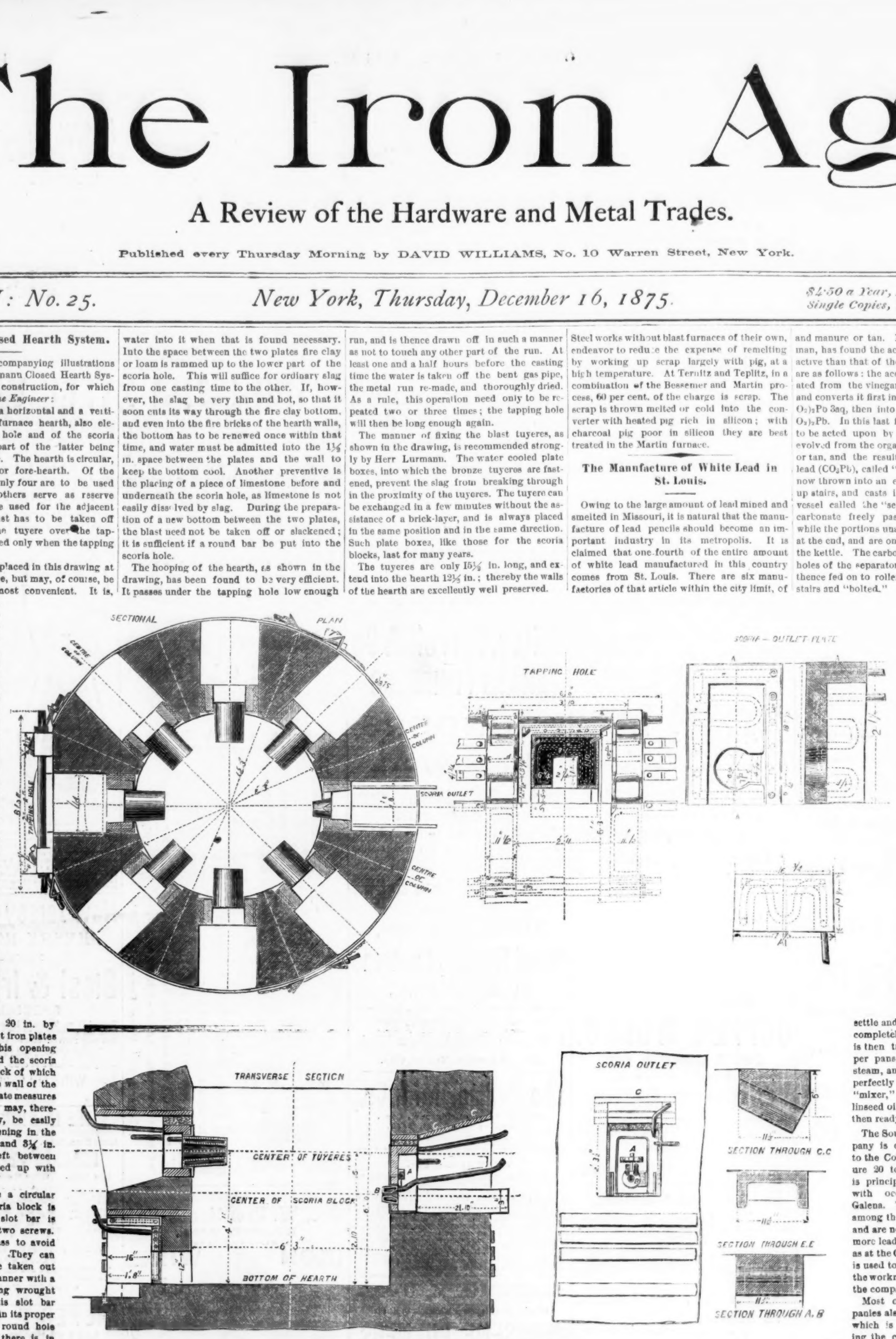
The slag run before the scoria block is formed by two cast iron plates, 34 in. by 9 in. by 1 in., being placed 1½ in. from the sides of the opening in the wall. This 1½ in. space is left empty for the purpose of admitting cold water into it when that is found necessary. Into the space between the two plates fire clay or loam is rammed up to the lower part of the scoria hole. This will suffice for ordinary slag from one casting time to the other. If, however, the slag be very thin and hot, so that it soon cuts its way through the fire clay bottom, and even into the fire bricks of the hearth walls, the bottom has to be renewed once within that time, and water must be admitted into the 1½ in. space between the plates and the wall to keep the bottom cool. Another preventive is the placing of a piece of limestone before and underneath the scoria hole, as limestone is not easily dissolved by slag. During the preparation of a new bottom between the two plates, the blast need not be taken off or slackened; it is sufficient if a round bar be put into the scoria hole.

The hooping of the hearth, as shown in the drawing, has been found to be very efficient. It passes under the tapping hole low enough that it may not be touched by the iron, in case it boils before the tapping hole. The horizontal plate at the top of the tapping hole opening is kept full of water. The vertical plate, called the tapping hole plate, is only to be put in when the tapping hole becomes shorter than 8 in. This plate is then to be connected with the water main. Should this rather feeble cooling by the plate be insufficient, then a dam of clay is made before the tapping hole after casting, and according to the degree of wear, water is kept before the tapping hole for a greater or less time. The water must in any case be removed from the front of the tapping hole one and a half hours before the casting time, to prepare the metal run and to dry it thoroughly.

If this kind of cooling be also not sufficient, the tapping hole plate is taken away altogether, and a | | shaped bent wrought iron gas pipe is placed close under the horizontal water cooled plate, and also close to the fire bricks. The gas pipe is bent to fit the depth and width of the tapping hole opening, and is provided with a number of small holes about three-quarters inch apart. After the casting this pipe is connected with the water main, and the water squirts then against the fire bricks. The water is collected before the tapping hole by means of a dam across the metal run, and is thence drawn off in such a manner as not to touch any other part of the run. At least one and a half hours before the casting time the water is taken off the bent gas pipe, the metal run re-made, and thoroughly dried. As a rule, this operation need only to be repeated two or three times; the tapping hole will then be long enough again.

The manner of fixing the blast tuyeres, as shown in the drawing, is recommended strongly by Herr Lurmann. The water cooled plate boxes, into which the bronze tuyeres are fastened, prevent the slag from breaking through in the proximity of the tuyeres. The tuyere can be exchanged in a few minutes without the assistance of a brick-layer, and is always placed in the same position and in the same direction. Such plate boxes, like those for the scoria blocks, last for many years.

The tuyeres are only 15½ in. long, and extend into the hearth 12½ in.; thereby the walls of the hearth are excellently well preserved.



PLAN AND DETAILS OF THE LURMANN CLOSED HEARTH SYSTEM.

Bessemer Process Developments.

—In a review of the iron trade for 1874, Hupfield remarks that in improvements in the manufacture of iron and steel, quantitative progress only has been made for the most part, the best example of which is in North America, where, for instance, at the works of Troy, New York and the Cambria Iron Works, Pennsylvania, an average of forty to forty-five charges is made in twenty-four hours, two converters producing close on 1,000,000 cwt. a year. On the Continent, and in England the old Austro-Swedish method of direct working from the blast furnace is much in vogue, with the intent to lower the cost of production, and so make head against competition (Neuberg, Turrach, Heft, Reschitza, Dortmund, Seraing, Creusot). This arrangement has, amongst others, been adopted at Georgs-Marien-Hutte, at the furnace No. V., which was blown in on the 3d of February, 1872. The results obtained are very good. Up to now, 1875, no plate box has been removed, all the tuyeres are still in their original positions, and there was only once a small breaking out of slag at the side of one of these boxes, but no breaking out of iron; and all this though the furnace works with six 3¼ in. nozzles and 4½ lbs. pressure of blast.

Steel works without blast furnaces of their own, endeavor to reduce the expense of remelting by working up scrap largely with pig, at a high temperature. At Ternitz and Teplitz, in a combination of the Bessemer and Martin process, 60 per cent. of the charge is scrap. The scrap is thrown melted or cold into the converter with heated pig rich in silicon; with charcoal pig poor in silicon they are best treated in the Martin furnace.

The Manufacture of White Lead in St. Louis.

Owing to the large amount of lead mined and smelted in Missouri, it is natural that the manufacture of lead pencils should become an important industry in its metropolis. It is claimed that one-fourth of the entire amount of white lead manufactured in this country comes from St. Louis. There are six manufactories of that article within the city limit, of which we will describe two. The Collier White Lead Co. claims to be the largest, and is, we believe, the oldest, having been founded in 1837. The works are divided into the "yard" and mill proper. The yard gives one the impression of an enormous stable yard from the tons of manure on every side, emitting the customary odor.

The lead is placed in a large kettle of some 16,000 lbs. capacity, and soon fused by fire from below. The molten metal is drawn off through two small iron troughs and run into shallow, circular iron molds, fastened on a moving leather belt, whilst the metal soon solidifies and drops out from the molds on their return trip. These pieces are now called "buckels," weighing from ⅛ to 1½ lbs., according to size, and are wheeled off to the "stacks," or manure beds, where they are placed in earthen jars, which hold in the bottom about half a pint of vinegar. Great care is taken to prevent the metal from touching the vinegar, however. A foundation of manure or tan is first made, some 18 inches deep, on which rows of pots are placed; on the top of these a flooring of planks is laid, then more manure, another row of pots, and in this order to any desired amount.

The lead is now left from 45 to 90 days to be acted upon by gases contained in the vinegar, and manure or tan. Mr. Richardson, the foreman, has found the action of the tan far more active than that of the manure. The reactions are as follows: the acetic acid ($C_2H_4O_2$), generated from the vinegar, attacks the lead (Pb), and converts it first into the normal salt $2(C_2H_3O_2)_2Pb\ 3aq$, then into the basic acetate $^2(C_2H_3O_2)_2Pb$. In this last form the lead is in a state to be acted upon by the carbonic acid (CO_2) evolved from the organic matter of the manure or tan, and the result is a white carbonate of lead (CO_2Pb), called "white lead." The lead is now thrown into an elevator, which carries it up stairs, and casts it into a large perforated vessel called the "separator," where the fine carbonate freely passes through the holes, while the portions unacted upon are carried off at the end, and are once more melted down in the kettle. The carbonate passing through the holes of the separator is received in a hopper, thence fed on to rollers, once more carried up stairs and "bolted."

Passing down through a pipe it is met by a stream of water, and by it forced over into the "mill proper," some half a block distant. Here it is received in a large vat, which feeds it into a series of "rake tubs" of about 1000 gallons capacity each. The object of the rake tubs is to keep the lead from settling, which is accomplished by means of revolving rakes or combs, which feed it into a grinder, then into the three "fine rake tubs," from which it is pumped up into the third story. Here are arranged three or four large vats or settling tubs, of some 12,000 lbs. capacity. The first of these receives the lead and water from the fine rake tubs, and when full the flow is shut off and turned into another. The lead is now allowed to settle and the water drained off as completely as possible. The lead is then transferred to large copper pans, which are heated by steam, and here it remains until perfectly dry; then carried to the "mixer," where it is mixed with linseed oil, once more ground and then ready for market.

The Southern White Lead Company is of nearly equal capacity to the Collier, and can manufacture 20 tons a day. The pig used is principally soft Missouri lead, with occasionally some from Galena. These two companies are among the largest in the country, and are now probably turning out more lead than any other. Here, as at the Collier Works, every care is used to preserve the health of the workmen, and men remain in the company's employ many years.

Most of the white lead companies also manufacture red lead, which is prepared by simply heating the carbonate in a reverberatory furnace at a low temperature, with constant stirring, by which the white lead is oxidized from $PbCO_3$ to Pb_3O_4 or red lead.

The Geological Survey of the Territories.—The Secretary of the Interior, in his annual report, says: The results of the geological and geographical survey of the Territories, conducted during the past season by Messrs. Hayden and Powell, under the direction of this department, will, it is believed, equal in interest and importance those of any previous year. The survey under F. V. Hayden continued its labors of the two preceding years in the Territory of Colorado. The survey of the southern and southwestern portions of Colorado has been completed. The total area surveyed was about 30,000 square miles, portions of which were rugged. The exploration of the remarkable pre-historic ruins of Southern Colorado, glimpses of which were obtained the preceding season, was continued with great success. The survey under J. W. Powell continued the labors of the preceding year in the Territory of Utah. Nearly 10,000 square miles of country were surveyed during the season just closed. The whole area surveyed during the season is classified by Mr. Powell as follows: Pasture lands, 50 per cent.; timber lands, 9 per cent.; mineral lands, 4 per cent.; irrigable lands, less than 1 per cent., and the remainder, over 36 per cent., waste lands.

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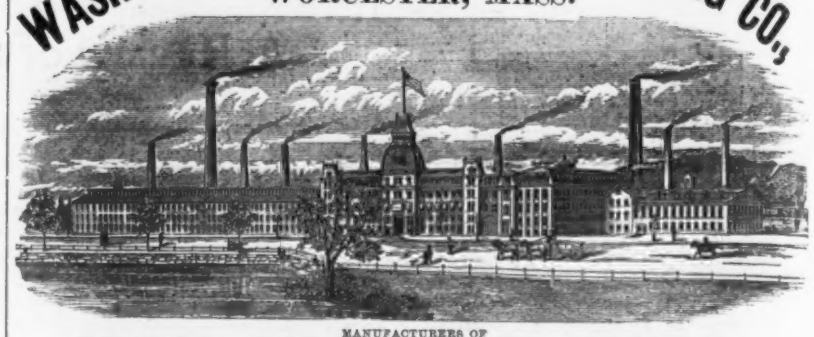

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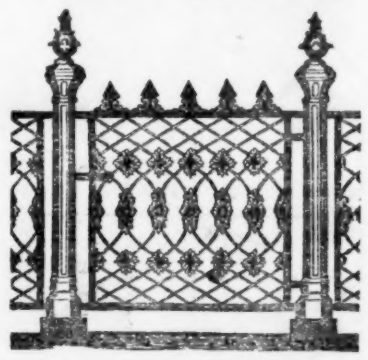

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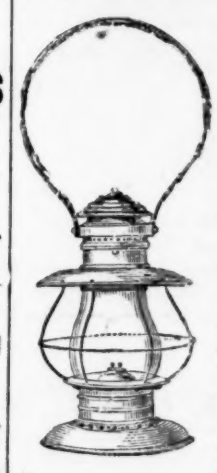

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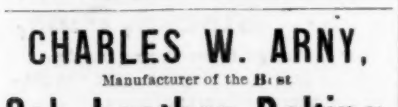

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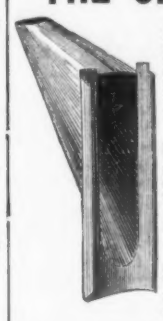

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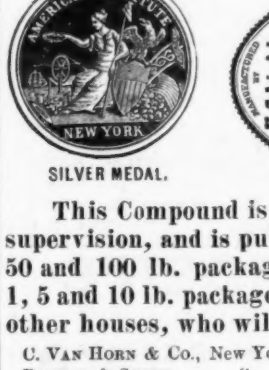

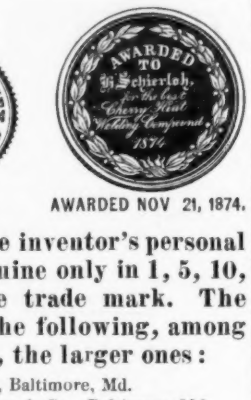

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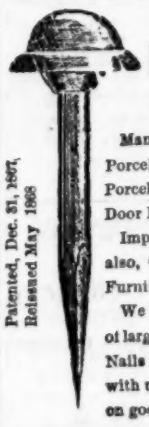

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Relations of Titanium to Iron.

BY RICHARD AKERMAN.

Titanium occurs in many iron ores, and sometimes in very large quantity. Thus a magnetic iron ore from Ulfo, in the Archipelago of Angermanland, contains, according to an analysis by Dr. A. Tamm, 9·51 per cent. titanic acid. Further, Herr Feroquist has found in a magnetic iron ore from Taberg, near Jonkoping, 6·30 per cent.; and in a magnetic iron ore from Longhult Mine, in Smoland, 8·5 per cent. titanic acid. Finally, in similar ore from Inglamola, in the same province, 5 per cent. titanic acid has been found (1).

Titanium is very difficult to reduce, and the incomparably greatest part of an iron ore's content of this substance passes in the furnace process into the slag, the color of which, in consequence, becomes dark to completely black, while in the pig iron produced it is commonly difficult to detect the least trace of it. Thus Herr J. E. Eklund, in an examination made at the Stockholm School of Mines, found scarcely a trace of titanium in the pig iron produced from the ore from Taberg, mentioned above; but the slag belonging to it, on the contrary, contained 8·55 per cent. titanic acid, and another furnace slag from Taberg ore has been found to contain 10 per cent. titanic acid (2).

Professor Eggertz (3), too, while assaying very titaniferous iron ores, has never succeeded in obtaining any titanium in the pig iron produced. Nor did any success attend an experiment made in Percy's laboratory (4) to produce titaniferous iron by fusing together oxide of iron and finely pulverized titanic acid in a graphite crucible, inasmuch as no titanium was found in the metallic buttons produced; but Sefstrom (5) on the contrary—probably in consequence of stronger blowing, and the higher temperature thereby occasioned—obtained a very titaniferous iron by heating, in a graphite crucible, a mixture of oxide of iron and titanic acid, and a similar mixture along with bisilicate of lime. In the former case he obtained a very hard but malleable iron, with 4·78 per cent. titanium; and in the latter a velvet black soft iron, with 2·2 per cent. titanium. In a third experiment, similar to the second, there was obtained an unmalleable white and hard pig iron, with 0·5 per cent. titanium. That this substance is sometimes also found in pig iron produced in the common way appears from the fact that Mr. Riley (6), after several unsuccessful trials with different varieties of pig iron, finally found, in several which were produced partly from titaniferous bog ore from Ireland, very considerable contents of titanium, or from 0·5 to 1·6 per cent. Further, Rammelsberg (7) has found a small content of titanium in a spiegeleisen from Lohhutte, in Musen, and finally Karsten (8) says that a trace of titanium may be found in many varieties of pig iron.

Beside occurring in the furnace slag, titanium is also found in copper colored compounds which are found most frequently in the form of small cubical crystals, but also in an uncrystalized state, partly on the bottom and walls of the furnace, partly in the so-called pig iron clots, and partly also in the slag itself. These were at first believed to consist of metallic titanium, but, according to Wohler, their composition is represented by the formula TiC^2N^2, $+3Ti^3N^2$. This compound of titanium may, according to Herr Zincken (9), be volatilized at a high temperature, and its occurrence is by Wohler considered to be connected with the formation of the cyanide of potassium in the furnace.

In the dry assay of titaniferous iron ores there is commonly observed between the pig iron and the slag, and also around both, a copper red film, which, in all probability, also consists of the compound of titanium just mentioned. Karsten (10) further states that he also found in pig iron small red grains, and that it is only in the pig iron in which they occur, that any noticeable content of titanium is found, in consequence of which he doubts whether iron and titanium can enter into any true chemical combination with each other.

Ores rich in titanium are, as has already been mentioned, specially difficult of reduction, so that the quantity of fuel required for their dry assay is much greater than when other ores are employed, and this circumstance may perhaps be explained in this way, that the titanic oxide or acid indirectly increases the difficulty of reduction, inasmuch as it tends to retain a part of the oxide of iron in combination with itself. When the black slag obtained in the dry assay from titaniferous iron ores has been fused several times in succession in a graphite crucible, small buttons of pig iron have, according to J. Akerman (11) been obtained every time; but the remaining slag has been still of the same degree of blackness. It is also remarkable that titaniferous iron ores are often smelted in a graphite crucible with the same result, whether they are fluxed with lime or quartz.

The salts of titanium are fusible with difficulty, on which account titanium makes a charge difficult to smelt; but, notwithstanding all this, it may yet be a question if titanium is not favorable to the formation of spiegeleisen. It cannot be considered as absolutely established, but it is a fact, that spiegeleisen can very readily be produced from Taberg ore, notwithstanding the small quantity of manganese (0·4 per cent. protoxide of manganese); and this ore, notwithstanding its richness in magnesia (18·3 per cent.) and poverty in iron (31·5 per cent.), differs from the Swedish ores only in this that it contains a little vanadium and a great deal of titanium. Somewhat larger percentages of manganese have indeed sometimes been found in Taberg ore than that mentioned above; but that the fitness of this ore for the production of spiegeleisen must be derived from some other cause than the common one—that it is to say, the presence of manganese—is believed to be shown by the fact that two pieces of spiegeleisen from different works in Taberg district, analyzed at the Stockholm School of Mines, contained 0·15 to 0·2 per cent. manganese; and it appears probable, therefore, that either vanadium or titanium is the cause wherefore spiegeleisen is so easily formed from this ore.

Ulfo ore has, in consequence of the difficulty of reducing it, been used only to an inconsiderable extent, and, as far as I know, no spiegeleisen has been produced from it; but that it tends to give a white pig iron appears from Clason's experience that when not more than 19·4 per cent. of a basic charge, which previously gave dark gray pig iron, was at Bollsta furnace exchanged for Ulfo ore, the iron became white, with only here and there a gray speck interspersed. Titanium may possibly therefore favor the tendency in iron to combine with the carbon occurring in it; but if this is in truth the cause of the phenomenon just mentioned, the action of titanium must be very powerful, for the pig irons thus produced have been found to contain, as has been already mentioned, scarcely a trace of the substance in question. However this may be, it is worthy of notice that the specimen of spiegeleisen from Taberg has not been found to contain more carbon than common charcoal pig, and that it is not brittle like other spiegeleisen, but, on the contrary, very difficult to break in pieces.

With reference to the difficulty of reducing titanium, and its tendency to combine with oxygen, it is probable that the titanium sometimes occurring in pig iron is oxidized during the refining process, and in malleable iron, so far as I know, titanium has never been found.

By fusing together 99 parts of steel and one part of metallic titanium Karsten (12) obtained a good steel throughout, but its contents of titanium was very variable, and Karsten finds in this circumstance an additional support to his views that titanium and iron in the metallic state do not enter into any true chemical combination, but are merely mechanically mixed with each other. This steel, after polishing and etching, took on a very fine damascening.

Faraday and Stodart (13) have attempted, by fusing together steel filings and a mixture of charcoal in one case with titanic acid, and in another with titaniferous iron sand, to produce titanic steel. In this way, too, a good steel was obtained which took on damascening, but no trace of titanium could be discovered in it, and this notwithstanding that a specially high temperature was employed for its production.

From what has been stated it is thought to follow that it is only exceptionally that any reduction of titanium has taken place in the case of mixtures of titanic acid or compounds of oxides of titanium with iron and charcoal. Attempts have been made to produce titanic steel by fusing together compounds of titanic acid with charcoal and iron, but Percy states that many well known analysts have sought for titanium in such steel without success; and, without setting up for a judge in this question, I may add that I have not found any titanium in such steel. This is also the case with Mr. Riley (14) who has taken so much trouble with determinations of titanium, and who found so considerable quantities in some varieties of pig iron.

To how great an extent the titanium crotchet has been carried is best seen from the circumstance that the superiority of Dannemora iron and other first rate brands of steel iron, has been attributed to the richness in titanium of the ores used in their production (15), the fact being that, so far as I know, no titanium has been found either in Dannemora ores or in any of the other Swedish ores, from which the most renowned varieties of steel iron are produced.

From the facts above stated it appears to follow that if titanium is of any observable use in the manufacture of steel, its influence on the qualities of the iron must be so exceedingly strong that so small a quantity as can with difficulty be discovered by analysis acts upon it; and this is confirmed, to some extent, by the fitness of Taberg ore for the production of spiegeleisen; or the influence of titanium must be indirect, by conducing to the removal of substances hurtful to the steel. This, perhaps, may be the case, at least as far as sulphur is concerned, for at the furnaces where Ulfo ore is used it is believed that the danger of red shortness is considerably diminished by a mixture of less than 10 per cent. Ulfo ore in a charge containing sulphur. There are those also who affirm that titanium purifies from phosphorous, but I know of no facts to prove this. On the other hand, it is contradicted by the fact that Dr. A. Tamm has, in the pig iron produced in the dry assay of Ulfo ore at the School of Mines, recovered the whole of its content of phosphorus, which, however, was so small (the ore containing only 0·07 phosphoric acid) that a final conclusion can scarcely be deduced from this experiment.

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(1) "Jernkontorets Annaler," 1866, pp. 143 and 246; 1853, p. 256.
(2) "Jernkontorets Annaler," 1857, p 135.
(3) "Om kemisk profning af jern," &c. p 22.
(4) "Percy's "Metallurgy; Iron and Steel," p. 165.
(5) "Jernkontorets Annaler," 1829, p. 346.
(6) "The Journal of the Chemical Society, Ser. 2, vol. 1., p. 387.
(7) "Chemische Metallurgie," 2te Aufl., p. 111.
(8) "Eisenhuttenkunde," 3te Ausg., T. 1., p. 534.
(9) "Annales de Chimie, 3ieme S., T. 29, p. 166.
(10) "Poggendorff's Annalen, Bd. 28, p. 160.
(11) "Jernkontorets Annaler," 1852, p 269.
(12) "Eisenhuttenkunde," 3te Ausg., T. 1., p. 534.
(13) Percy, "Metallurgy; Iron and Steel," p. 164.
(14) "The Journal of the Chemical Society," Ser. 2 vol. 1., 387.
(15) "Engineering, 1874, vol. xi., pp. 374 and 415.

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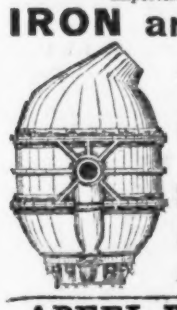
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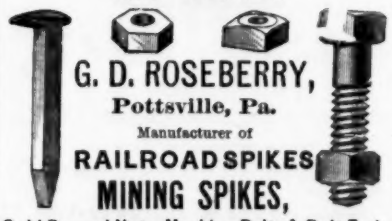
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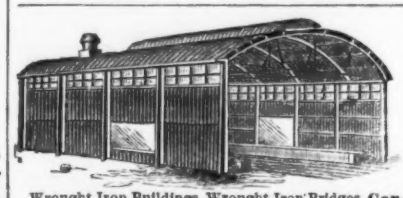

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New Patents.

We take from the records of the Patent Office at Washington the following specifications of certain patents lately issued, which will be found interesting:

IMPROVEMENT IN APPARATUS FOR PRODUCTION OF IRON AND STEEL FROM THE ORE.

Specification forming part of Letters Patent No. 169,560, dated November 2, 1875, issued to William A. Lyttle, of the Grove Hammersmith, England.

This invention relates to an improved process and apparatus for producing iron and other metals from their ores in a molten condition.

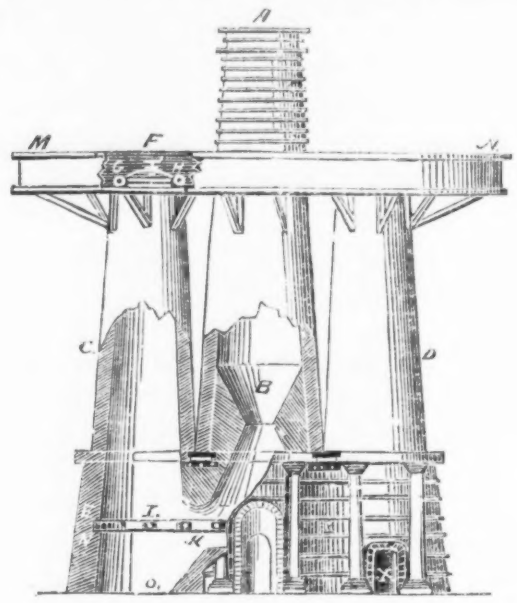
According to the said process employ ore in a pulverulent condition, or reduce the ore to powder; and in order to facilitate such reduction, heat or roast the oar, and plunge it while hot into water, so that it becomes partially disintegrated. Mix the ore powder with any plastic earthy material, such as clay, mud, peat or sediment of sewage, adding, in some cases, lime to increase cohesion, and to take up sulphur and silica, and with carbonaceous matter and suitable fluxing materials. The carbonaceous matter, which is also in a state of powder, may be coal, coke, peat or charcoal, or such matter as is comparatively free from phosphorus. The quantity of carbonaceous matter is such as to suffice for the reduction of the ore, and also to furnish the fuel necessary for its reduction and fusion. The fluxing materials are selected according to the nature of the ore treated, so as to form with its products a fusible slag, and its quantity will depend also on the nature of the iron, and on the quantity of clay employed to agglutinate the mixture. These ingredients are thoroughly mingled together by any known method of pugging, so as to form a cohesive compound like bricks in their moist condition, and the compound may be molded into bricks, or may be simply extruded in lumps of irregular form and size from the pug mill. The bricks or lumps of compound may be dried; but this is not necessary when they are to be treated in a furnace such as described. Also, when bituminous coal or raw peat is employed as the carbonaceous material, the compound or the lumps thereof may be coked by heat like ordinary coals; but this is also unnecessary.

By dispensing with the drying or coking of the compound a large economy of time and of heating power is effected.

The bricks or lumps of compound prepared as above described are charged into a vertical furnace or cupola fed at the top, so that the hot gases rising from the lower part of the furnace serve to dry and coke the upper layers of compound before they reach the hot zone of the furnace below.

The form of furnace for smelting iron according to this process is represented partly in section and partly in elevation at Figure 1 of the accompanying drawings, a sectional plan of the same being shown at Fig. 2.

The furnace is arranged for the purpose of keeping the fuel out of contact with the material under treatment, the latter being exposed only to the action of the flame or gaseous products of combustion. The central portion A superincumbent mass of fuel. These chambers are provided with covers F at top, which are removed from time to time for charging with fuel, and replaced so as to leave no opening for escape of products of combustion at the top of the chamber. Blasts are directed into the lower part of the fuel chamber, as indicated by the arrows O P Q R in Fig. 2, and the action of these blasts is distributed uniformly over the mass of fuel at the bottom of the chamber by means of a ring, I, of trough form in section, into which the several tuyeres are led. The products of combustion from the mass of fuel burning at the bottom of the chamber, finding no escape upward, pass by the passage K L into the cupola A B, and the heat at the base of the cupola may be intensified when required by additional blasts, as indicated by the arrows diverging from A and B, Fig. 2. The bottom of each fuel chamber of this furnace may be carried down, as a blind, well below the level of the plane of combustion, in which the tuyeres of the blast are placed, and by providing this well with a side door, X, the ash and clinkers may be periodically removed. The bottom of the cupola A B with its hearth, tapping holes, and other details is of ordinary construction.



IMPROVED FURNACE.—*Fig.* 1.

It is obvious that an arrangement of furnace such as described may be employed for smelting or melting purposes generally, presenting the advantage of keeping the fuel separate from the material under treatment.

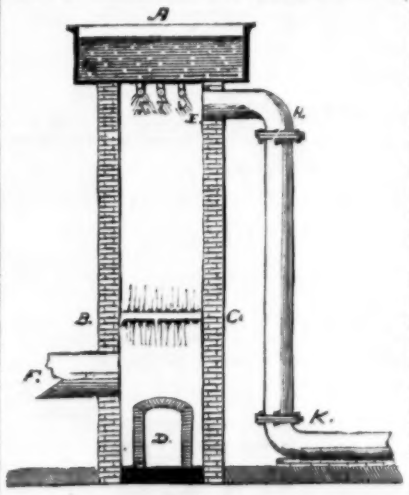


Fig. 3.

B is the cupola, in which the smelting is effected. On each side of it at C and D is a chamber containing the fuel, made to taper outward toward the base, so that the fuel may descend freely, and constructed of such hight that the adhesion of coked fuel to the lower part may be overcome by the weight of the

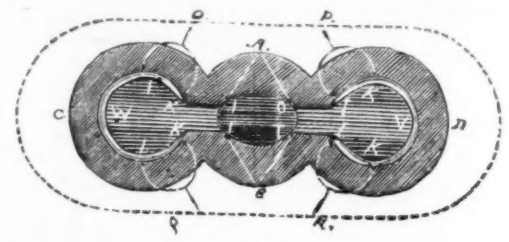


Fig. 9.

When an ordinary cupola or blast furnace is employed for treating the lumps or bricks of compound, the fuel and lumps of compound are charged in the usual way in alternate layers when the lumps are compounded with only the quantity of carbonaceous matter necessary for reduction. If, however, they are compounded with sufficient of such matter, not only for reduction, but also for furnishing the fuel necessary for fusion, the layers of fuel may be dispensed with, and in that case the lower part of the furnace is charged, in the first instance, with fuel of an open character, such as coke, the combustion of which serves to get up the heat and to dry the lumps of compound fed above, after which the combustion of the fuel in the lower lumps suffices for the continuous working of the furnace without the addition of separate supplies of fuel.

When it is desired to utilize for heating purposes the combustible gases so escaping, it is of advantage to separate from them the watery vapor and carbonic anhydride, as well as to cleanse them from solid particles suspended in them. For this purpose make the top mouth of the furnace communicate with the lower part of a tall chamber, in which a shower of water is kept falling. The water condenses the steam and throws down the solid impurities, and as a large portion of these consist of lime in a caustic state a considerable portion of the carbonic anhydride is absorbed by combination with the lime and water to form carbonate of lime. The gaseous products, thus to a large extent purified, are conducted from the upper part of the purifying chamber to be utilized for heating purposes.

Fig. 3 represents a vertical section of a purifying chamber, suitable for operating as described. It consists of a tall chamber surrounded by a cistern A, from which water issues by nozzles S T V, arranged so as to spread it into a diffused shower. The products of combustion from the furnace enter the chamber by the lower pipe F, and ascend in a direction opposite to that of the descending streams of water, being finally conducted away by the pipe E H K. A grating B C, is with advantage placed in the chamber to break up and distribute more completely the descending streams, and by making this grating of double bars overlapping each other, the gaseous ascending currents are brought into more intimate contact with the descending liquid. The water, with the solid matter carried down by it to the bottom of the chamber, may filter away by a gravel bed, a door D, being provided for the removal from time to time of the solid matter that is retained.

When lead is smelted, as above described, the purifying chamber shown in Fig. 3 is of advantage for throwing down and retaining the lead, "smoke," or oxide, which is usually lost.

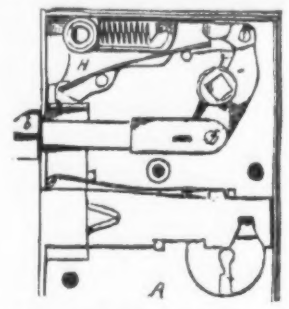
Claim.—1. The combination of the cupola in which the smelting is effected, chambers C and D made to taper outward toward the base, cover F, ring I, into which the tuyeres of the blast are led, and passage K L.

2. The combination of the cistern A, from which water issues by nozzles S T V, pipe F, through which the products from the furnace pass, pipe E H K, grating B C, and door D.

We take the following abstract of new patents, recently issued, from the official record:

REVERSIBLE LATCH.

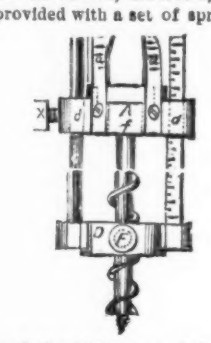
To Wm. M. Griscom, Reading, Pa.—A reversible latch lock, in which a sliding spring plate



H, carrying a spring, *b*, and having a tubular projection, *m*, arranged as described, in respect to the screw openings in the lock case, is combined with a lever, F, and a swiveled latch spindle.

BIT GAUGE.

To Alonzo B. Batson, Newcastle, Ind.—The gauge is provided with a set of springs, which

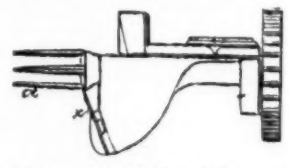


clasp the end of a bit brace, and thus hold the gauge in position for use.

The combination, as a bit gauge, of the socket head A, with its opening *f* and spring clasps *a*, the lugs *b*, and set screws *c*, the side bars C, and the foot piece D.

APPLE PARING MACHINE.

To Wm. M. Griscom, Reading, Pa.—A supplementary fixed blade is combined with the



frame and pronged spindle of the machine in such a manner that the said blade will remove from the apple that portion of the skin which the ordinary paring blade fails to remove.

The combination, in an apple paring machine, of a blade, *x*, attached to the frame, with the pronged spindle A.

Russian Locomotives.—At the beginning of 1875 the total number of locomotives on the forty-four railways of Russia was 3443. The forty-four lines having a total length of about 10,900 miles, the average is rather less than three locomotives to a mile. Only 607, or 17·64 per cent. of the whole number, were built in Russia. Of these, 183 were constructed in Alexandrow's Works, St. Petersburg, 167 in Kolomna's (Struve's), 133 in the works of the Russian Mining and Manufacturing Company, St. Petersburg, 104 in Malzow's Works at Brjansk, fourteen in Wotkin's Works, and six at the St. Petersburg depot of the St Petersburg and Warsaw Railway. Of the 2835 locomotives from abroad, 1051 are from Germany, 656 from England, 654 from France, 276 from Austria, 176 from Belgium, and 22 from America. The maker who has sent in the greatest number is Borsig, of Berlin, who has built 583. The average cost of a Russian locomotive being 20,000 roubles, the stock represents an outlay of 56,000,000 roubles.

The iron telegraph poles in Persia are put to a novel use. A friend who has lately returned from that country informs us that between Teheran and Shiraz it is the common custom of the inhabitants to use the poles as targets for rifle shooting. Standing at one post and shooting at another, the people find the telegraph poles most convenient institutions for gun practice, and, no doubt, many believe that it is their proper and legitimate use. The poles are made of sheet iron, and the natives test their guns by trying whether the bullet will pierce the post. Some posts are thus riddled with holes, and soon give way altogether. The reason why telegraph posts in Persia require frequent renewal is no longer a mystery.

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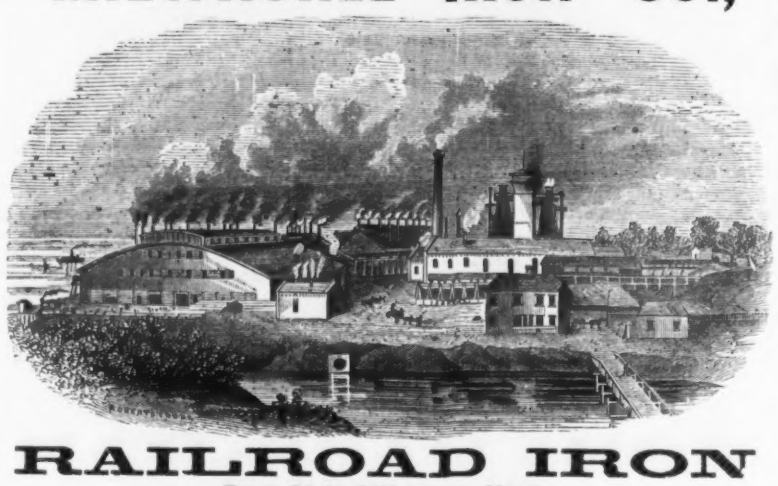

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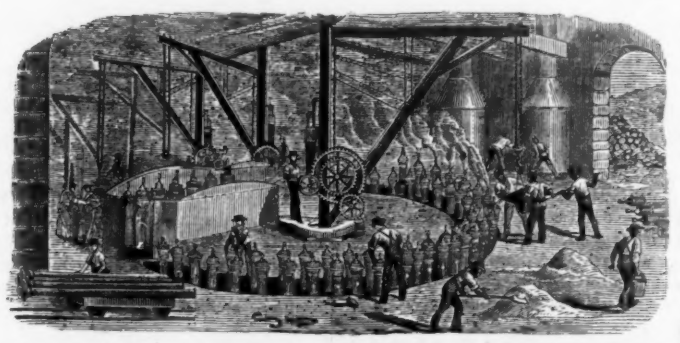

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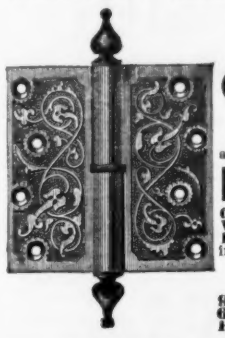

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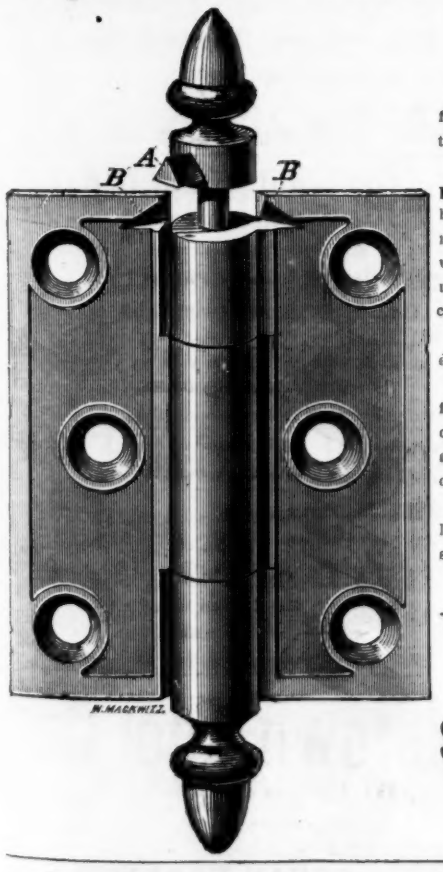

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On the Uses of Steel.

BY J. BARBA, NAVAL CONSTRUCTOR, LORIENT.

NO. VIII.

Reducing steel plates into special forms may be effected in different ways, keeping always in view, of course, the conditions just prescribed. The plate may first be brought cold into the desired form by hydraulic pressure over a large area, or by light hammering, care being taken to stop well within the point where there is a chance of rupture. The plate will then be annealed uniformly to a cherry red heat, and it can then be subjected to fresh pressure. After this annealing it will be seen that the plate is much easier worked than at first. These processes will then be continued, until at last the plate is brought to the desired form by a series of slight deformations, followed by annealing.

The plate may also be manipulated by heating it all over, and then bringing it to form either by dead pressure, or by hammering, which should cease when the plate is at a dull read heat. When the desired form has been obtained after one or several heatings, it should be put again in the fire and then allowed to cool slowly without being touched. If a slight twisting should result from this last annealing, it can be brought back to form when cold by a light hammering.

These two methods are equally reliable when carried out thoroughly.

Working steel plates hot presents no difficulty when stopped at red heat, and the metal should adapt itself perfectly either to stamping, or under rapid blows of the hammer. We will take two examples. A great number of pieces have been molded out of steel plates ·34 in. thick. They present the form of a cap, the top of which has a polygonal contour. To make them, a prismatic mandrel fixed to an anvil is employed with a corresponding matrix attached to a steam hammer. The plate, heated to a bright red, is placed on the anvil, and by two strokes of the hammer it is brought to the desired form. The production is thus completed at a high temperature; the plates are found to be very mild after this operation, and are touched by the file as easily as before. Final annealing is thus dispensed with. Other plates have been subjected to stamping, to mold the ends to fit between the double T irons of a deck framing. A molding of 3·15 in. has been formed on three sides of these plates, which are ·315 in. thick, the molding corresponding in form exactly to the flanges of the double T iron. The plate being laid flat on an anvil is formed with the blow of a hammer. But by this operation alone it is not possible to give the exact form desired, and the angles are finished at a second heat, the plate being laid on another anvil, and worked with the hammer. A complete annealing follows this second operation. Pieces of this form have been made in considerable quantities without difficulty, the metal remaining as soft as it was originally.

Annealing the steel plates ought to be performed with care, and to be very uniform; as they are generally very thin, the temperature may be considered as equal throughout their thickness. It should be always effected with charcoal, but an absolutely uniform temperature over a large surface cannot be relied on. The best way is to heat them in a common furnace, or better, Siemens' furnace;* the temperature in this latter can be regulated perfectly, and it is easy to avoid either an oxidizing or a carbureting flame, which would affect the homogeneity of the plate. In order to make the annealing more complete, the heated plate should be cooled slowly. This is easily effected in a charcoal furnace by leaving the plate within it, and allowing the fire gradually to go out—a detail impossible in a gas furnace. This precaution, however, is not indispensable for thin plates, which may be cooled on the floor of the shop, care being taken to avoid local contact with good heat conducting materials, and with a soil unevenly moist, which would produce in certain points a fall of temperature more rapid than in others. The difference in temperature between the interior and the exterior of a plate during the different phases of its cooling, is so slight that the greater contraction of the outer surfaces only induces a very slight pressure and temper. Complete cooling under these conditions requires, moreover, a very considerable time.

The gas furnace is the most convenient and the simplest mode of restoring plates locally affected to the mildest condition of which they are capable. Punched plates can be easily subjected to annealing under these conditions; the heat removes the effect of the punch, the plate can afterward be rolled, and these operations produce no sensible change in the form nor in the position of the holes. The process may thus be employed in many cases to remove the effect of punching instead of enlarging the holes, a matter already fully considered.

The precautions which the manipulation of plates involve, and which have just been explained,† have evidently more importance, as the plates are richer in carbon, but even with the mildest steel they must not be lost sight of. It is known that iron plates that have been severely worked, submitted to heat and to local hammering, have to be annealed before their original homogeneity and elasticity can be restored. They are much less subject than steel to the phenomena of temper, since they contain traces only of carbon. The elastic properties of the metal vary but little with the local pressures established, and the ruptures which appear spontaneously in steel are not looked for; annealing has, therefore, for its chief aim to restore that portion of the elasticity absorbed by the process of molding, but it also contributes to correcting faults of homogeneity, which may exist in the metal itself.

Angle irons, to be brought into form, are principally subjected to pressure for opening or closing the members, and thus making them acute or obtuse, according to circumstances; they have also to be bent or curved, the angle produced by the first operation remaining unaltered. For the ships built at Lorient, when the curving and squaring up are not too great, the work is done cold, and a large part of the angle irons can be treated in this way. The alteration of the angle is effected by means of a powerful punching machine into which some necessary modifications are introduced. To produce obtuse angles, the matrix is replaced by a piece, the upper surface of which forms an obtuse angle; the punch is replaced by a piece, corresponding in profile with the matrix. Packing pieces allow the relative positions of the parts to be modified. The angle iron being placed on the matrix, and the machine put in movement, the punch presses the angle iron, which is opened as the punch descends. Various alterations are obtained by taking away all or part of the packing pieces, which, moreover, can be changed at will at different parts of the angle iron. In cases where considerable alteration is required, care is taken not to produce the whole effect with one blow, but to arrive at it by a succession of deformations extended over a certain length. For the greatest changes other matrices and punching blocks are substituted. To close the angles, the same machine is employed with modifications.

The angle irons thus brought to the desired form in this direction are then taken to be bent. This operation is effected by means of screw presses. The angle iron bears upon the fixed points, iron blocks being introduced to prevent any alteration in the angle previously obtained; in the head of the screw is placed a stud free to turn, and the edge of the angle iron rests in a notch in the end of this stud, which does not turn as the screw is advanced. By turning the lever at the end of the screw, sufficient pressure is brought to bend the angle iron into the curve desired.

Experiments were made to ascertain the alterations produced by these two operations. Test bars were cut from angle irons bent to different curves, and with and without altered angles. The following results were obtained with angle irons 2·95 in. × 2·95 in. × 3·15 in., and 3·94 in. × 3·94 in. × 3·95 in.

These figures show that curving angles to a large radius, and altering their webs but little, produces but an insignificant effect on the resistance and extension at rupture. With a curve of 10 ft. and an angle of 18° the extension at the point of rupture were higher than 15

TABLE NO. XIX.

Alteration in Angle.	Radius of Curve.	Flat Bar.		Curved Bar.	
		Resistance to Rupture.	Extension per cent.	Resistance to Rupture.	Extension per cent.
Deg	ft.	Tons per sq. in.		Tons per sq. in.	
0	118·11	31·20	·180	30·56	·190
0	47·25	27·33	·180	28·72	·100
0	32·28	30·33	·100	32·02	·065
18	118·11	29·17	·170	28·91	·185
18	118·11	30·71	·155	31·50	·167

per cent. A great number of angle irons for framing used at Lorient are worked under these conditions. When, however, the angle irons require to be more bent and distorted, the conditions so simple before now become complicated. The process possesses for excessive bending the disadvantages of curving the flanges, and the angles have to be curved in their width. Such pieces could not be employed, and it was necessary to straighten their distorted parts before using them. This can be done with obtuse angles, by removing the outer part forming the summit of the angle, but for acute angles, hammering, with all its inconveniences, is unavoidable. Moreover, when the curve is a sharp one, the wing of the angle iron, which ought to be flat, and on which the action of the bending press is exerted, becomes distorted under the effects of the compression, and a series of inequalities present themselves which cannot be removed by the press alone. Hammering then becomes necessary. Under the influence of these various causes—sharp bends, distortion of the angles and blows of the hammer—many cases of rupture at first occurred at Lorient. At that time the dangerous effects of hammering were not fully understood, and it was only after considerable experience that hammering without special precautions was forbidden. Moreover, several cases of rupture occurred where the angle irons had not been hammered; this fact appeared somewhat remarkable, when considered in reference to the extensions obtained at the point of rupture with test bars cut from the curved and bent angle irons.

But by careful consideration the conditions under which the work had been performed could be understood, and these conditions could be easily modified, so as to render cases of rupture extremely rare.* This we will proceed to explain. The processes of bending and changing the angles had all the disadvantages of hammering when these changes were very great, local pressure, and consequent tempering, being thus produced. This fact could be observed in the preliminary process of modifying the angles. The parts of the angle iron exposed to the pressure of the blocks in the apparatus used became compressed, very slightly when the changes were small, considerably when they were great, and especially when any alteration of magnitude was effected with one operation of the press. In such a case the fibers comprised between the portion opened or closed by the machine, and the adjacent parts which are not affected are subjected to permanent elongation. When this part is afterward subjected to deformation the extended fibers become compressed. It is to avoid this pernicious succession of strains that the angle irons are subjected to very slight and gradual changes, in order to bring them to their ultimate shape. With such a precaution the bad effect of compression is considerably diminished, and is spread over a large number of points.

* The Siemens' reheating gas furnace has been of very great value in working mild steel plates at Lorient. The hearth of the large furnace is 46 ft. long, and 7 ft. 10 in. high over all. It works economically, and enables regular heats to be taken with great promptitude.

† More than 750 tons of steel plates have been treated at Lorient in the manner described, and without a single rupture.

* Working cold was very rapid and economical; it had, moreover, the advantage of great accuracy: for these reasons the process was retained as long as possible in preference to working hot, which could be executed without difficulty, but which was longer and more costly, and which involved, as a final operation, corrections either with the bar cold or hot. The cold method, moreover, allowed a great number of angle irons to be bent before the gas furnaces were started. And constructions in steel were not so far developed as to allow one of these furnaces to be kept up constantly, the only condition compatible with economic working.

The Trade in Quicksilver.

A noteworthy feature of current trade is the depression in quicksilver. This has been the more noticeable because, not long since, the conditions were just the other way; the market then was in a very excited state, and advanced to as high as 90c., gold, per pound, whereas now it is down to 72c., gold. The causes of the large advance were of a peculiarly interesting character. The famous Rothschilds control a large number of the quicksilver mines of Europe, on leases periodically procured from their owners—the Spanish, Austrian, Italian, and, we believe, also the French and Russian governments. In this way they were enabled to control all the important mines of Europe that were in any way available. The terms of the lease, of course, depended largely on the value of the mineral in the market. The Rothschilds have long been known as among the shrewdest merchants and bankers in Europe, and this quality was never more clearly shown than in their adroit manipulations of the market previous to making their last contract, which was with the Spanish government. A short time before that event, the London market, which is entirely under their control, began to decline, and kept going gradually down until a marked reduction in the price was established. In consequence of this, prices in San Francisco and New York also weakened from sympathy. Dullness and unrelieved depression thus came to be the features of the three markets—the companies in San Francisco especially taking a discouraging view of the sudden and unaccountable turn in the state of affairs at London, which one day quoted strong prices and the next a disastrous decline. Suddenly prices on the other side moved up again, the markets of San Francisco and New York keeping pace with them, and everything again was cheerful, with a brisk trade. The chemical companies were forced to enter the market and to purchase considerable supplies here, while the exports from San Francisco to the East Indies largely increased. After the "flurry" had subsided, the causes of it were closely inquired into, and it was then found that it was "all owing to the manœuvres of the Rothschilds," who had broken down the London market temporarily, while they secured, in consequence of the low prices thus made to represent the actual value of the mineral, a more favorable renewal of a former contract with the Spanish government. After that transaction was completed, they then gave the sign and prices went upward as with a flood. In the course of time, however, the inevitable reaction came. The India markets would not pay the prices of the Rothschilds, and buyers in this country would not concede the prices of those who were following the lead of those merchants. The consequence was just what might have been anticipated; prices began to weaken, then to gradually decline, and finally to come down with a crash. The state of the market at present, naturally reflecting this last movement, is dull.

The quicksilver traffic is large, and may be said to be quite remunerative. The foreign exports of San Francisco in October last were valued at $178,514, and this is about the average for each month of the year. The exports are to China, Japan, Chili, Mexico, Bolivia, New Zealand, British Columbia, South America, Central America, Hindostan, Russian Asia and Australia. China, which uses it largely in the manufacture of vermillion that is sent back in considerable quantity to this country, is the largest buyer and Mexico next. The receipts of the mineral at San Francisco during the ten months ending November 1, were 39,755 flasks, against 19,500 during the same period last year—an important increase. The flask of quicksilver weighs about 75 pounds.

As regards the production of this useful mineral, it is stated that Spain produced last year 36,000 flasks; Austria, 8000, Italy, 2700, and Borneo, 2000. California, which annually produces about 45,000 flasks, promises to give nearer 50,000 flasks this year. This State is in advance of any other country in the world in its production. San Francisco has more trade in it than even London, though it is not so much ahead of that market as some others. It appears from the official returns of the London Board of Trade, that the receipts there during the nine months ending October 1 were:

Years.	Flasks.	Value.
1875	33,393	£2,751,688
1874	31,413	3,138,203
1873	30,138	1,848,526

The exports were 24,990 flasks during the same period this year, 25,787 same period 1874, and 21,632 flasks same time in 1873.

The price of quicksilver here in New York is governed almost entirely by the course of the San Francisco market, though London quotations have more or less influence. There is usually a very satisfactory margin between New York and San Francisco, and a large quantity is sent here every year. At present the quotation in the latter market is 65c. gold, while here it is 75c. gold.—*Daily Bulletin.*

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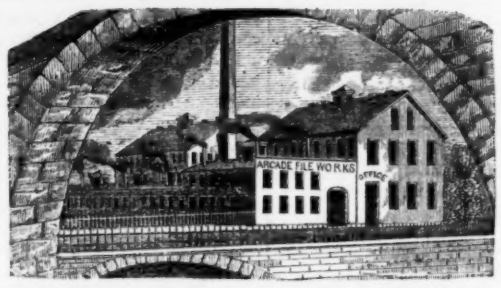

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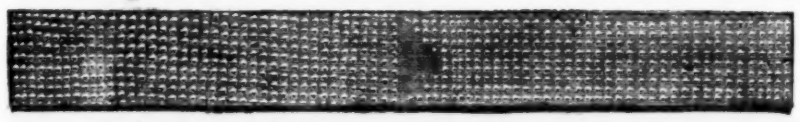

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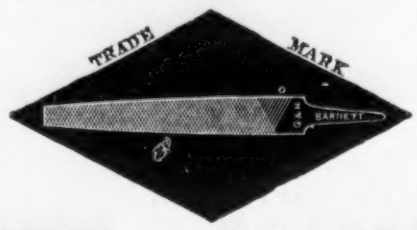

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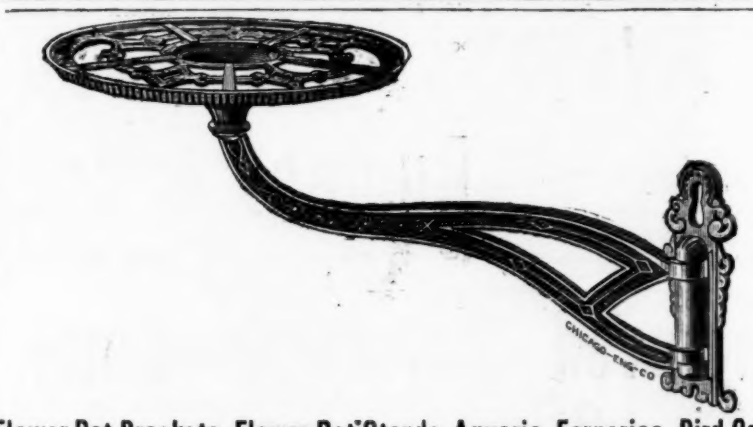

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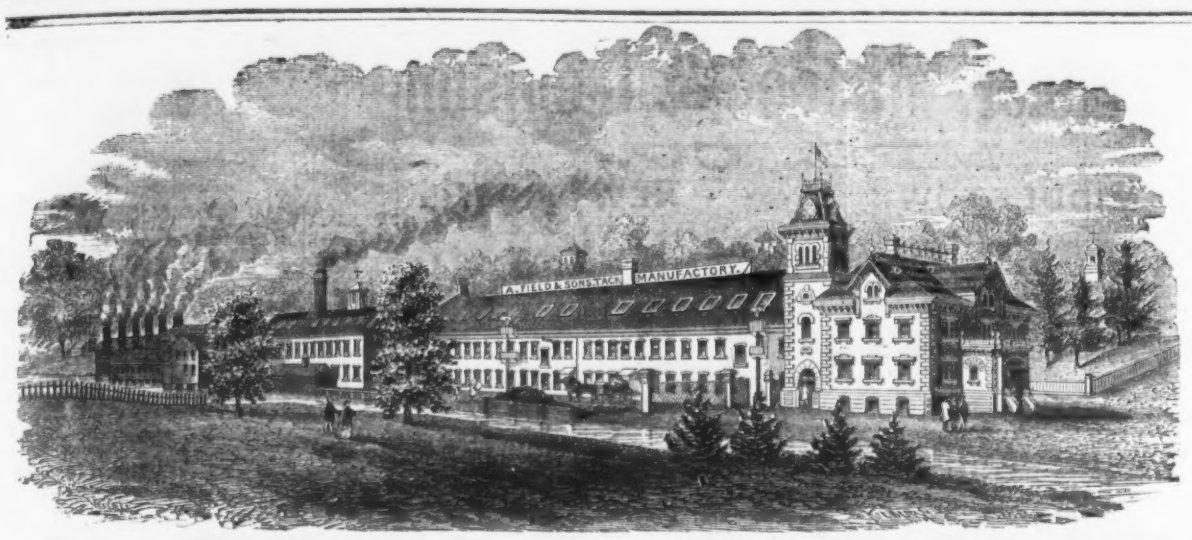

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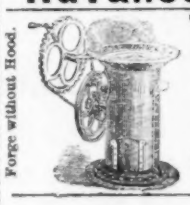

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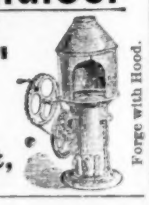

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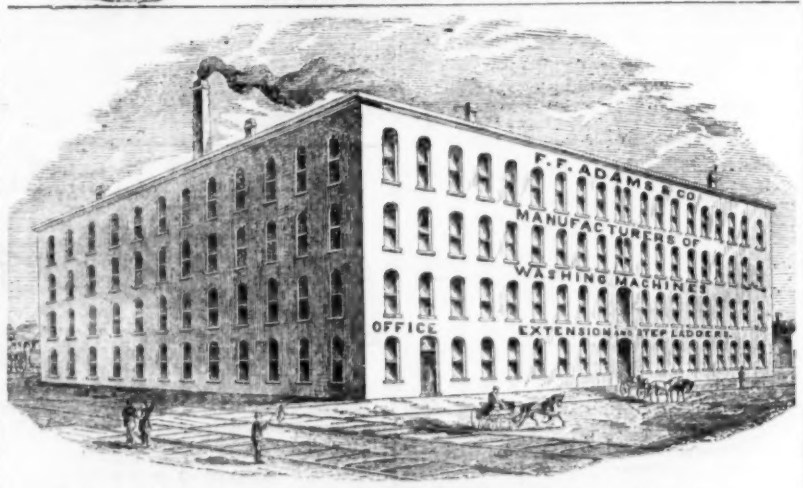

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Wilson's System of Making Iron Direct from Ore.

BROOKLYN, N. Y., Dec. 9, 1875.

To the Editor of The Iron Age.—For some weeks past I have been examining the system of operations, by which Mr. Joel Wilson makes blooms and billets of iron direct from the ore, and ask a short space for my conclusions. Mr. Wilson has now in operation, at Split Rock, Rockaway town-ship, New Jersey, one of his new patent deoxidizers, four Catalan forge fires and a puddling furnace; two of the forge fires are new and not yet in good working order. During the time of my observations he made 2100 to 2600 pounds of billets in the puddling furnace in a shift of 8 hours, and the same amount of charcoal blooms in each fire per 24 hours. The entire consumption of charcoal to make the blooms was not over 130 bushels, including 30 bushels of breeze put in the deoxidizers, to the 2400 pounds made, and I am of the opinion that the consumption was sometimes under that amount, and might be made so constantly with proper management. Mr. Wilson stated that one ton of broad top coal with 30 bushels of coke or charcoal breeze answered to make 2400 pounds of billets in the puddling furnace, and private conversation with the men confirmed this statement, but I did not watch the operations of the puddling furnace as carefully as the bloomary fires.

The simple advantage of Mr. Wilson's system is that the ore reaches the blooming fire heated fully to 1000°, which heating is all accomplished with waste heat, and, in doing this, Mr. Wilson's apparatus has the great merit of simplicity and cheapness. He seems to have gotten it as near perfect as possible. The saving may be put down primarily as in the charcoal used, amounting to fully 150 bushels, assuming only 300 bushels to have been used in the old system, and, at the same time, there is a saving of labor.

As to the mode of making puddled iron I conceive that Mr. Wilson has in a plain, simple manner accomplished a great result. He takes 1¾ tons of ore, assaying not over 65 per cent. of metallic iron, and makes therefrom 2260 to 2300 pounds of hammered billets. Thus there is a loss of 8 per cent. Mr. Wm. E. S. Baker states, in *The Iron Age* of Jan. 7, 1875, that the average quantity of pig consumed to make a ton of finished bar iron through a term of 16 years was from 5-100 to 1 ton. Suppose we put it at 50-100; hence to make the ton of bar iron there is a loss of one-half a ton or 1120 pounds. Truran makes the best English average have a loss of 196 pounds, or about one-twelfth. Mr. Baker's best American, as seen above, is one-twentieth. If we suppose a further loss of 5 of the percentage to convert Mr. Wilson's billets into finished merchant bar, then we have, say, a total loss of 13 of the total 113 percentage of metal in the ore; or, 113 pounds of iron in the ore makes 100 pounds of bar iron. The ore Mr. Wilson is now using is a fair New Jersey magnetite, but other ores have been tried in his apparatus with equally good results. This ore of Mr. Wilson's can be bought almost anywhere, North or West, at $6 to $7 per ton; the pig iron is now worth, in the same sections, $20 to $22 per ton. Hence we have a loss, on the average, of one-half on an article worth $20 per ton in the old system, and a loss of 13 per cent., or about one-eighth, on an article worth $6 per ton by the Wilson system. In plain figures the raw material to make a ton of bar iron will cost, by the old indirect system, $30 on the average, and by Mr. Wilson's system the raw material will cost $10·50, making a difference of $19·50 in favor of Mr. Wilson, assuming labor to be the same, and Wilson's is not greater than the old system.

The common custom with mill owners in Pennsylvania, I am informed, is to give the puddler 2240 pounds of pig, and expect from him 2000 pounds of merchant bar. This is a loss of one-tenth, and on a cost of $20 for the pig, is equivalent to $2 on each 2000 pounds made. With 1¾ tons of ore, costing $10·50, more than that amount of bar can be made by Mr. Wilson's system. The difference is, therefore, in favor of Mr. Wilson, at least to the amount of $9·50 on each 2000 pounds. An experienced puddler now at the Wilson Works at Split Rock, says he can turn out 3600 pounds of iron by Mr. Wilson's system with more ease and in the same time in which, by the old system, he turned out 2500 pounds.

It is not necessary to enter into the chemistry of Mr. Wilson's system; that has been discussed again and again, and is not new; my view of the matter is that he has not produced, specifically, a new article of iron, but that he has invented a better and more simple apparatus, and a better and cheaper system of operations for producing wrought iron direct from the ore than has ever before been laid before the public. His billets have proven first-class for rolling into sheet for galvanizing, and his blooms have been practically endorsed by John Roach & Sons, who, I am informed by Mr. McMonnies, of 96 John street, agent of the company, has given them a very considerable order. I am aware that it has been objected that iron can only be made by this system on a small scale. My observation indicates that it can be limited only by the number of deoxidizers and fires; one deoxidizer will feed three puddling fires or eight bloomary fires; these would make from 9 to 10 tons of billets or blooms per day. There certainly cannot be any reason why by the simple multiplication of deoxidizers and fires there should not be made 100 tons per day. And by the simple use of a squeezer and rolls the lump be made direct into muck bar instead of hammered billets.

It is not, further, a fact that Mr. Wilson's system will work with the New Jersey magnetites, and not with poorer or other ores. It has been tested with various brown hematites, and specially with the brown hematites and fossil ores of Georgia and Alabama. As a matter of course, with leaner ores, containing necessarily greater amount of impurity, the loss will be greater. For instance, that of a 50 per cent. ore, it would take 120 pounds of ore to make 100 pounds of bar iron. But such ores are always cheaper in price. In Alabama, Georgia and Tennessee, where 50 per cent. ores can be obtained in abundance at $2 per ton, or even less, it is plain that there would be a corresponding reduction in the cost of the bar iron.

The works on the Wilson system are now running at Split Rock, seven miles from Rockaway Depot, N. J., and I speak from pleasant experience when I state that a most excellent pair of horses can be had from the hotel in Rockaway at a moderate price. Mr. Wilson asks the most searching investigation of his system and the severest tests of his iron. In my humble judgment both will bear the scrutiny—the system as the most simple and cheap method yet brought to light; the iron as being of the best quality. The works at Split Rock are not so well arranged as might be, and any engineering eye can see improvements and saving in arrangement, as well as the fact that abundant heat passes from the deoxidizer to produce steam from boilers, but in the struggles of inventors with limited capital against old established ideas "makeshifts" have often to be used.

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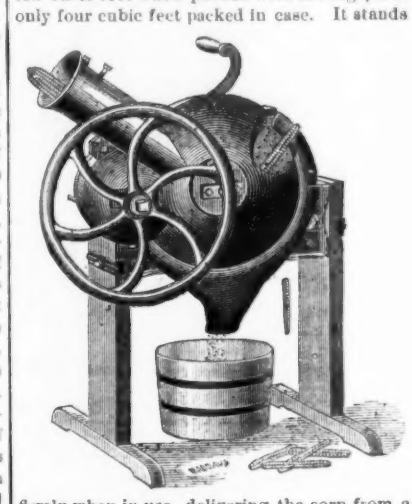
The Burrall Corn Sheller Improved.

We illustrate herewith the improved form of the Burrall corn sheller. The wooden legs render it much less liable to break than the old style. In shipping the body of the sheller sits down between the legs, so that it not only stands firmly but occupies but little space; ten cubic feet when packed with the legs, and only four cubic feet packed in case. It stands



firmly when in use, delivering the corn from a spout and the ears separately on the other side. The spring being ribbed at the end, instead of smooth, as formerly, holds the cob until it is shelled clean, even though it be quite green, and the machine shells the smallest as well as the largest ears perfectly. The weight of the machine is 120 pounds. The fly-wheel is speeded up so as to get a good momentum for the work.

The New York Plow Co., of 55 Beekman street, in this city, are the manufacturers.

Natural Gas.

The Philadelphia *North American* says: It has been asserted that the supplies of natural gas in portions of this State and of Ohio are inexhaustible. They are certainly great and continue equal to what they were when discovered. After centuries of flow in India and Persia the gaseous streams there remain as constant as at first. Building upon these facts the iron manufacturers at Pittsburgh have brought this gas through 15 miles of pipe to their furnaces, and substituted it for coal. It flows with sufficient head unaided, and each of two firms expects to clear $40,000 annually on a prime outlay of $110,000, because they save 20 per cent. in making iron. The proof of profit has gone so far that another and greater gas well, three miles further from Pittsburgh, has got into the courts preliminary to better service; and capitalists are waiting a decision, prepared to use it for all the manufactories of the city.

The availability of the fuel for almost every purpose has been tested, and it has stood the tests. There is almost no cost beyond that of the land containing the wells and the pipes conveying it. This, compared with coal under any circumstances and at any price, gives a great advantage to manufacturers having the gas; and no part of the problem remains undetermined but the permanence of the supply. Assuming that as fact, the demonstrated saving of 20 per cent. that has led to this considerable outlay certainly promises results in the manufacture of iron in this State that can hardly be calculated. Such an economy would not only force the Canadian protectionists, who recently demanded a duty of $2 a ton on imported pig iron, and equal bounty on that produced in the Dominion, to revise their schedule, but it would act very seriously on the manufacture of this State and country. It is nothing more or less than manufacturing iron without fuel—the capitalization of permanent outlay for fuel at $150,000 or $500,000 equalling that result.

There is one drawback to the rejoicing that might be had over this result, and this is that neither Pittsburgh nor science can foretell how long this supply will last with any approximation to certainty. Geology and chemistry are at variance about the origin and all that qualifies the continuance of the gas. If it flows as it has done and is doing, and as the firms who have made this expenditure believe it will continue to do, then certainly a new leaf is turned in the iron industry of the State, the nation and the world; and we who have so long labored to gain a part of the business of the country may anticipate gaining very much more than has ever been dreamed of.

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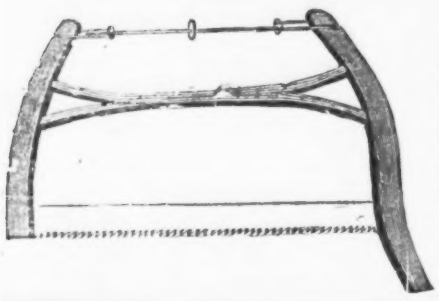

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Patented June 28th, 1870.

The annexed engraving represents my ELLIPTIC FORKED SAW FRAME, which commends itself to the trade for its simplicity of construction. The Forked Brace being all in one piece, without any center bolt, secures for the Frame great strength and durability. These Frames are put up with my best Webs, marked "No. 40, Harvey W. Peace."

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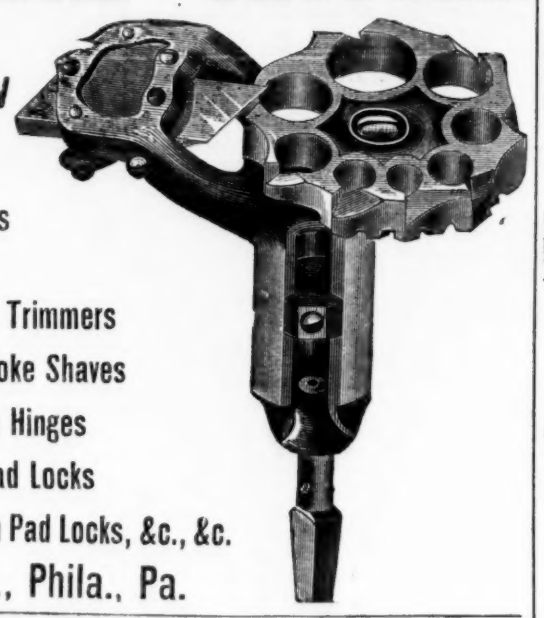

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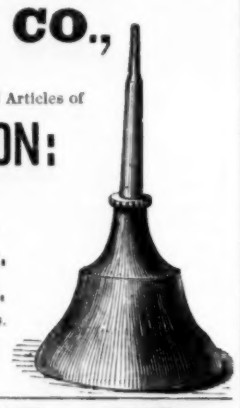

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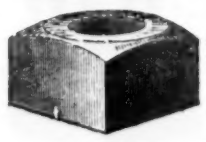

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Of Superior Quality of all sizes, both

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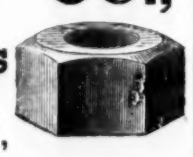

From ¼ inch to and including 1⅛ inch Bolt.

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Of every description, including

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Manufacturer of

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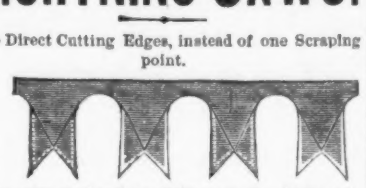
Also Sole Manufacturer of

LIGHTNING SAWS.

Two Direct Cutting Edges, instead of one Scraping point.



Note extra steel and durability over the old **V**, outlined on **M** tooth.

Telegram Dated Oct. 1st, 1874.

STATE FAIR, EASTON, PA.

To HENRY DISSTON & SONS:

Philadelphia, Pa.

I want you to publicly test that challenge on Cross Cut Saws. Name time and place within thirty days. American Institute preferred. E. M. BOYNTON.

Henry Disston & Sons, dare not respond.

E. M. Boynton gave on Wednesday of last week an exhibition of what his Lightning Saw could do at the Pennsylvania State Fair, in which two men sawed through a sound oak log, 16 inches in diameter, in 17 seconds. Mr. Boynton informs us that his export trade is increasing, he having lately made large shipments of his saws to Australia and other distant markets.—*The Iron Age*, Oct. 8, 1874.

For fuller report of this exhibition see the *Easton Morning Dispatch* of Oct. 1st, 1874.

Henry Disston & Sons cannot furnish Lightning Saws. Why do they imitate mine?

J. FLINT,

Manufacturer of

ALL KINDS OF

SAWS

And Plastering Trowels,

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A large Stock of **Cross Cut Saws** constantly on hand. Orders filled promptly. **Dietrich's Double Handle One Man Cross Cut Saw** made with any kind of tooth desired. Our patent method of grinding Hand Saws makes them superior to any in the market.

Send for Illustrated Price List.

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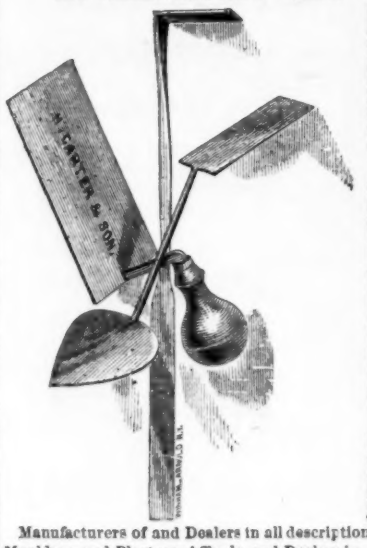

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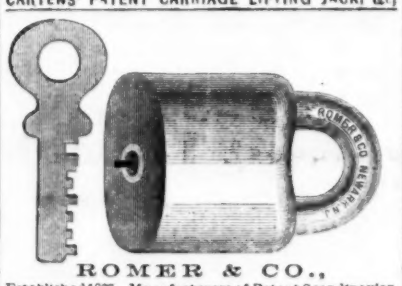
Manufacturers of and Dealers in all descriptions of Moulders and Plasterers' Tools, and Dealers in General Hardware, Gilded Copper Weather Vanes.

CARTERS' PATENT CARRIAGE LIFTING JACK, &c.



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Established 1837. Manufacturers of Patent Scandinavian or Jail Locks. Brass Pad Locks for Railroads and Switches. Also, Patent Stationary R. R. Car Door Locks. Patent Piano and Sewing Machine Locks. 141 to 145 Railroad Avenue, NEWARK, N. J. Illustrated Catalogue sent on application.

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At each of these places a complete assortment of samples of Hardware and Fancy Goods will be found, including all new descriptions. Sole Agents for

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JAMES OHLEN

WARRANTED

PATENT ·•· GROUND

SECOND TO NONE

COLUMBUS, O.

make a specialty of the LARGEST SIZES of **Circular Saws**, and call particular attention of lumber manufacturers to the following points of excellence:

Evenness of Temper.—The peculiar structure of my furnace subjects all parts of the saw to a DEAD heat, and when dipped in the oil bath secures perfect uniformity.

Perfect Accuracy in Thickness.—My saws are ground on a patent machine, automatic in its operation, grinding off the thick places upon the plate before the thinner parts are reached, and when the saw is removed BALANCES PERFECTLY, which is proof positive of the right accomplishment of the work.

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I am sole proprietor and manufacturer of the celebrated **"Challenge" Cross-Cut Saw.** Price Lists of all kinds of saws sent on application.

JAMES OHLEN.

JOHN MAXHEIMER,

Patented,

June 3, 1862; April 6, 1869 Dec 23, 1873; Jan. 20, 1874; Dec. 22, 1874. April 20, 1875.

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Bright Metal

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REDUCED PRICES.

Set Iron Dogs,	¾ to 2 in.	$ 5 00
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Iron and Steel Clamps, Die Dogs, Clamp Dogs,

Vise Clamps, Expanding Mandrels, &c.

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AMERICAN LOCK MFG. CO.,

Manufacturers of

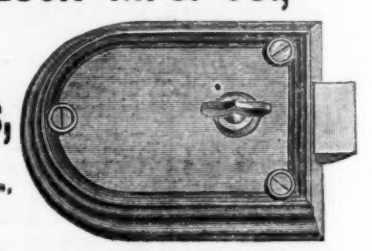
FELTER'S

Locks & Latches,

Comprising

Store Door Locks, Night Latches, Drawer, Desk and Pad Locks,

All of which are furnished with



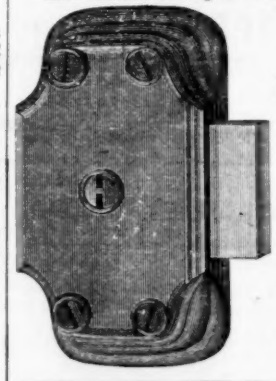
SMALL, FLAT, AMERICAN STERLING METAL KEYS,

Which are stronger than steel, ***and cannot be affected by rust,*** and will remain bright and clear under all ordinary circumstances.

A candid examination will convince the most unbelieving, that for simplicity, durability, convenience, and safety, they challenge comparison with any now before the public. Being made entirely by new and expensive machinery, especially constructed to manufacture them, ***they will rival the best made Locks in Finish and perfect operation.***

These Locks give perfect satisfaction, because they are the safest, cheapest and most durable Lock ever presented to the public, having ***thirty-five*** finely finished Brass Tumblers in each Door, and twenty-eight in each Drawer Lock, each one being finely false notched.

Each tumbler bearing on the key at two different points while locking or unlocking, without the aid of springs, which cannot be said of any other patent Tumbler Locks in use.



THE LOCKS ARE FITTED TO THE KEYS

And not the Keys to the Locks.

Hence Counterfeit Keys cannot be made.

For descriptive list and terms, address

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Bemis & Call Hardware & Tool Co.

This Wrench can be furnished with Briggs' Pat. Nut or Sleeve.

PATENT COMBINATION WRENCH.

These Wrenches are made from the best of Wrought Iron, with Steel Head and Jaw. Case-Hardened throughout, and not only combine all of the superior qualities of our cylinder or Gas Pipe Wrenches, but also all requisite Combinations of a regular Nut Wrench, thus making a Combination which has no equal.

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Also the exclusive makers of the "Patent Ivory" or Celluloid Knife, which is the most durable White Handle Knife known. These Handles never get loose. Always call for the "Trade Mark"
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Manufacturers of
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The **only Knives made** that are put together in such a manner that there is no strain on the covering or frail part of the knife. We warrant our knives equal in cutting qualities and workmanship to any made, and are acknowledged by English makers as the **Best American Knife.** We also make
NICKEL & SILVER PLATED POCKET KNIVES
which will not rust or become discolored when used as a Fruit Knife, and their cutting qualities are equal to any other knife. Orders filled from the factory, and in New York by **Messrs. J. Clark Wilson & Co.,** No. 81 Beekman Street (who have a full stock of all patterns always on hand), and also by **Messrs. G. B. Walbridge & Co.,** No. 99 Chambers Street.

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Manufacturer of Patent

SHEARS & SCISSORS.
Made by a new process **RECENTLY PATENTED** which enables me to produce goods that in quality, finish and general excellence surpass any. *All warranted Solid Cast Steel Blades.*

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Silver & Deming's Coach Machinery, Iron and Wood Truss Hoops, all sizes.
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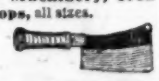

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My Blades are forged from the best Cast Steel, and warranted. To me was awarded the GOLD MEDAL of the Connecticut State Agricultural Society; also a Medal and Diploma from the Mass Mechanics' Ass'n Sept., 186.

George W Bruce,
No. 1 Platt Street, N. Y., offers a full assortment of
ENGLISH and ATLANTIC SCREWS,
Iron and Brass, Flat and Round Heads, and, though the American monopolists may eventually stop the importation, his friends may rely on any orders entrusted to him being executed at the most favorable rates. An assortment *in bond for export.*

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KNIVES & FORKS,
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CELEBRATED CUTLERY,
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The demand for **Joseph Rodgers & ons'** productions having considerably increased, they have, in order to meet it, greatly extended their Manufacturing Premises and Steam wer.
To distinguish Articles of **Joseph Rodgers & Sons'** Manufacture, please to see that they bear their Corporate Mark.

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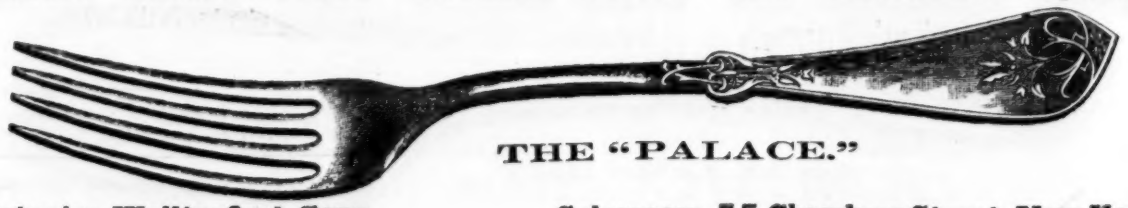

THE "PALACE."
Factories, Wallingford, Conn. Salesroom, 75 Chambers Street, New York.

PHILADELPHIA CORRESPONDENCE.

PHILADELPHIA, Dec. 13, 1875.

The beginning of the week of which I write was principally occupied in discussing the message and the reports of the heads of departments, and business was, to some extent, interrupted. Political documents are not within the province of discussion of a trade paper, but the prevailing opinion here is that the present occupant of the White House "put his foot in it" more completely and particularly in the message of 1875 than any previous President. Independent of the secular matters, which, however proper in theory, only serve to render such a document a fire-brand when indorsed by national authority, the manufacturers of the country have had their fears excited by the very peculiar recommendation in reference to duties, viz.: that those on all articles entering into manufactures might be reduced. Here, at one word, and clearly without any such intention, almost the whole tariff would be swept away. The question "what is raw material?" is one to which no answer can be made by any committee, since the pig iron which is raw material to the founder is the finished product of the furnace man, while the steel bar of finest dimensions is but the raw material of the watch spring maker. But tariff discussions will be simply such at this session. No party can afford to upset a tariff, good or bad, on the eve of a presidential campaign, and the probability is that before the session is half over there will be graver matter than the tariff to take action on. Still, it is to be regretted that our institutions do not permit a censorship which should revise and prune presidential messages before they are issued, since very well meaning officials unfortunately too often write a great deal of injurious nonsense.

The important trade news of the week is that of the decision of the conference of iron manufacturers and puddlers at Pittsburgh on the 11th inst., to compromise on $4·75 per ton for boiling iron, the arrangement to continue in force until February 14th, 1876. This prevents the threatened lock-out and stoppage of the mills, and, whether wisely or not, continues the production of bars. In one point of view it may be considered beneficial, and that is in the prevention of much suffering. The puddlers showed their sense in yielding a point, and, unlike those at Conshohocken, near here, have kept their work. Just how low iron is going seems to be a mooted point now, and there are very many who believe it will go lower than it is at present. It is to be remembered that good No. 1 foundry pig sold for $19 per ton in 1858–9, and bars at 2 cents per lb. This, at a gold basis, would represent $21·66 at present premium, and he would be a bold man who would assert that equally good No. 1 pig has not been sold at these figures within the past month. The argument in favor of still lower prices is that there are large amounts of hypothecated iron—in fact, probably eight-tenths of the pig iron stock is collateral for from $10 to $15 per ton. The capital in this has been in it too long, with a steadily shrinking market, to please lenders, and they will realize the moment the chance is offered. Any improvement in demand would consequently bring this iron on the market, and for the time actually lower prices. But with the return of an active consuming demand, there can be no question that averagely low prices, yet still profitable rates, will rule. The material can be supplied lower than *ever before,* in the future. Already the stoppage of the collieries in the anthracite region has brought out the fact that the combination is about breaking up, and that next summer competition, however disastrous to the coal operators, will give cheap coal to the furnaces. First-class ores of like quality with Lake Superior can be, *are being* and *will be* delivered to the stacks so as to bring the cost of ore to the ton of iron below $9; labor is already down as low as desirable, and the one item of freights—after cheap coal is had—which still rules high, will be brought down. Hence the anthracite region will hold its own, in all probability, in the future, and if the process of coking anthracite slack or dust, reported in your last as successfully tried in Wales, obtains here, the future of the iron trade is far from gloomy, even in the seaboard States.

The Centennial appropriation by Congress is just now meeting with favor on all sides. It is so much easier to say, let the nation give it than to give ourselves, that it is not surprising that others outside of Philadelphia are in favor of a national gift to it. Pennsylvania and Philadelphia did, of right, all they could, and more than they ought to have done, but it is refreshingly cool, even in December, to see the advocates of a national appropriation who have given nothing themselves, recommending that the Exhibition shall be opened free to all. Well, Philadelphia could stand even that, and will, to make the Centennial a success. This week Congress and the heads of departments, Judiciary, &c., will visit it, and if the "crooked whisky" troubles can be forgotten long enough, will probably appreciate what has been done sufficiently to vote an appropriation.

Just now we are engaged in running a race in bridge building, the contestants being the Pennsylvania Railroad Company against time. There is a very large force at work, and by the way the thing progresses it would not be surprising if the new bridge at Market street would be up by New Year's Day.

It is reported that the sale of the old navy yard property has been approved at Washington, and that the Pennsylvania Railroad Company is preparing plans for a concentration of a large part of the freight and passenger business at that point.

We are to have a Centennial census of our population, taken in the English style, by leaving a blank form at each house, to be filled up at once and returned. It may work, but as it is done under the city officials, it is very doubtful.

The catalogue of the Department of Arts and of the Towne Scientific School, of the University of Pennsylvania, shows in the former there are 115 students, and in the latter 126. The course of study in the latter is particularly thorough, and will give us a number of very thoroughly trained young men for metallurgical technology very soon. The chemical course is very thorough, as is that of geology, where, beside the usual studies, the matriculates are trained in plotting field notes, contouring, making relief maps of mineral properties, constructing sections, thus converting their maps into clay models, casting these in plaster, and coloring these to show the structure of the country. Solid models of underground work are also made, to show the posture of veins and beds and their connection with the surface. These, with calculation reports and all necessary practice for actual work, are very valuable to the student. The University has taken a long step forward under the impulse of the late monetary bequests to it, and the special departments noted here will soon be in such a condition as to make the school second to none in our country, if it is, indeed, surpassed anywhere.

German Iron.

The London *Engineer* says: The sale in this country of German high-class iron has been recently attempted, we believe with some success, by Mr. A. Borsig, of Berlin and Borsigwerke, Upper Silesia, and who probably, more than any other German manufacturer, has a good prospect of obtaining a favorable reception for his iron in England.

The Borsigwerke Iron Works were established in 1863 by Mr. A. Borsig. They comprise four blast furnaces, which yield annually about 30,000 tons of manganiferous iron of high quality. In connection with this blast furnace plant, there are extensive puddling and steel works, the latter provided with three Martin furnaces.

About 3500 men are employed, and there are 45 engines in the establishment, representing collectively 4400 horse-power. The special productions at these works are high class boiler plates, manufactured from pig, produced from brown Silesian hematite ores, mixed with Styrian and Hungarian spathic ores. The following abstract giving the averages of a series of tests recently made with samples of boiler plates by Mr. David Kirkaldy will be read with interest. The length of the samples used in the experiments for tensile strains was in each case 18 in., the ends for a length of 4 in. being made wider than the body of the sample. In the tests for bulging stress, discs 12 in. in diameter were cut out of plates, and pressed into an aperture 10 in. in diameter.

TABLE I.—*Tensile Stress.*

		Thickness—Inches.	Stress. Elastic per Square Inch.	Stress. Ultimate per Square Inch.	Ratio of Elastic to Ultimate Strength.	Contraction of Area at Fracture.	Stress per Square inch of Fractured Area.	Extension. At 40,000 lbs. per Square Inch.	Extension. Ultimate.
Lengthw'y.	Unan-neal'd.	·64	29,125	53,405	54·5	27·4	73,492	4·97	23·8
	An'eld	·64	38,52[illegible]	50,466	56·5	27·8	70,097	5·93	42·7

TABLE II.—*Bulging Stress.*

	Thickness.	Stress in lbs.; bulged, inches. 50,000	100,000	150,000	200,000	Ultimate. Bulge	Stress
Unan-neal'd	·640	·95	1·57	2·07	2·60	in. 3·26	lb. 233,410
An'ld.	·640	·90	1·49	1·95	2·39	2·69	223,375

TABLE III.—*Bending Test.*

	Description.	Angle.	Effects.
Hot....	Lengthway.....	deg. 180	Uncracked.
"	Crossway.....	180	"
Cold...	Lengthway.....	150	Slightly cracked.
"	Crossway.....	57	"

Of the four samples submitted to bulging stress, one of the annealed and both the unannealed ones burst on arriving at the maximum strains recorded.

Old Hudson River Boats.

The Troy *Times* says: The Sunnyside disaster has caused no little inquiry as to how many of the Hudson River passenger boats have met with a similar misfortune. Some facts concerning this matter were furnished us by a well known citizen, formerly a river captain. The disasters which befell the Skiddy, the Empire, the Swallow, and the Henry Clay have been previously mentioned. The Chief Justice Marshall, built in 1835, blew up near Newburg a few years after, but was repaired and run again as a passenger boat for a short time on Long Island Sound, where it eventually sunk. The Helen, known as the "Burden Boat," ran ashore near Castleton in 1834, the year after it was built. The Sun, built in 1826, was burned in 1831. The North America, built in 1827, was cut by the ice and sunk in 1839—a disaster similar to that met by the Sunnyside. The Reindeer was blown up in 1850. Of the other boats that have run on the river, the Champion and Erie were the first four-pipe boats that ever came to Troy. They were day boats, and were considered very fast. They were run about the year 1832, but are now tow barges, their engines having been taken out. The Rip Van Winkle, built in 1845, has been broken up, as has also the Hendrick Hudson, both well known to Trojans. The Ohio, built in 1829, is now a tow barge, the engines having been removed years ago and placed in a Lake Erie tow boat. The Novelty, built largely at the expense of Dr. Nott, was a failure, and was broken up in 1831, when it was but one year old. The Fire-Fly and New London both outlived their days of usefulness, and were broken up or converted into barges. The Swiftsure blew up in 1836. The Constitution, Victory, and Sandusky have been broken up, as has been the South America, the consort of the North America. The Utica and Rochester, the first boats of the People's Line, Albany, still ply on the river as tow boats. The old Connecticut and Vanderbilt, that withstood so many storms, and so frequently plowed their way up the river to Troy through ice several inches in thickness, are now powerful tow boats. The Powell, Drew, Dean Richmond, and other Albany craft, together with the pet of Commodore Hancox, are the boats of to day, but like their predecessors they, too, will soon become things of the past, as better and faster ones will take their places. Although accidents on the river have been quite frequent, the fact is that the loss of life has not been nearly as great as that by railroad casualties along the Hudson River during a corresponding length of time. In nearly every case of accident on the river above mentioned, the loss of life was fully as great, if not greater, than by the recent sinking of the Sunnyside. The only one at which no death was occasioned was that of the Skiddy, the passengers from that vessel all having been removed without even having their feet wet.

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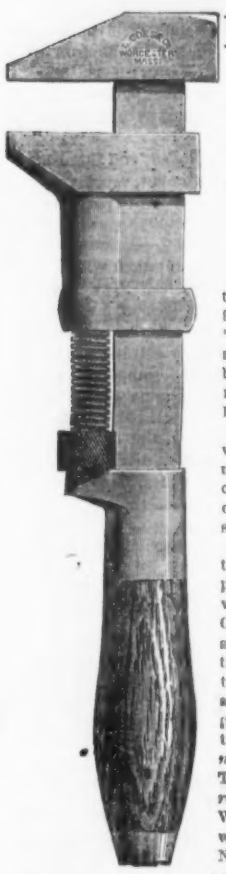

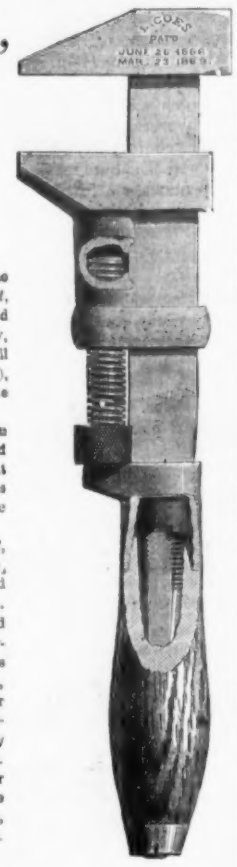

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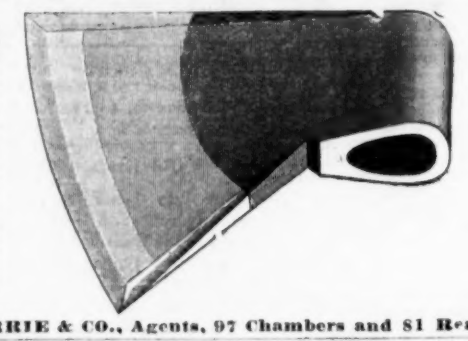

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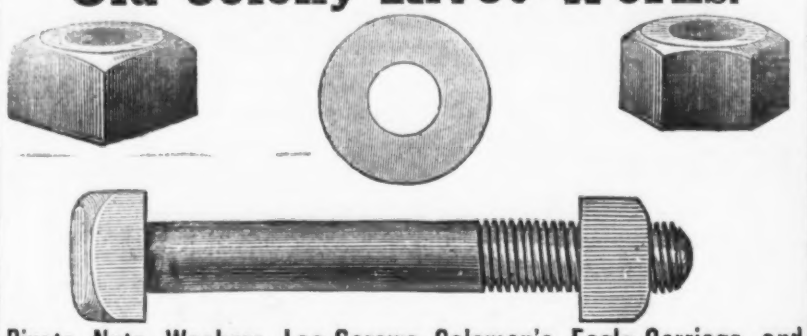

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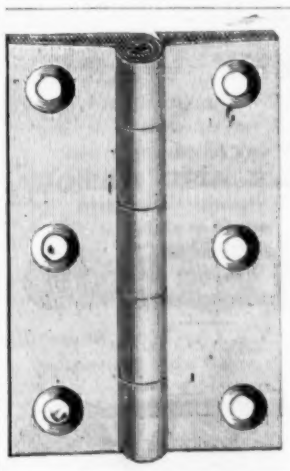

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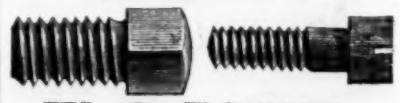

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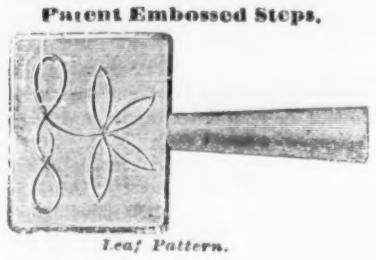
Patent Embossed Steps.



Leaf Pattern.

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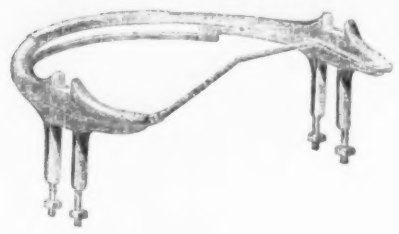
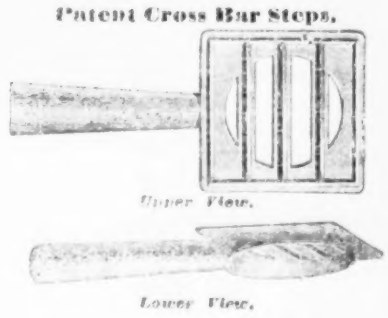


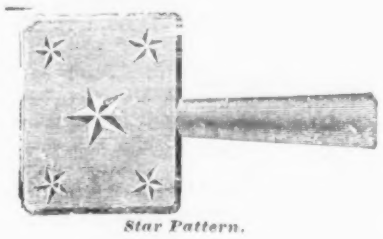
1871 Pattern Shaft Couplings.

Patent Cross Bar Steps.



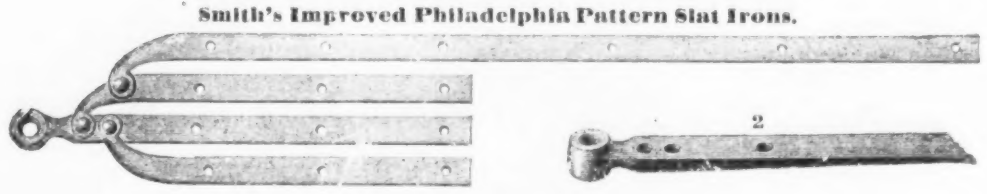
Upper View.

Lower View.

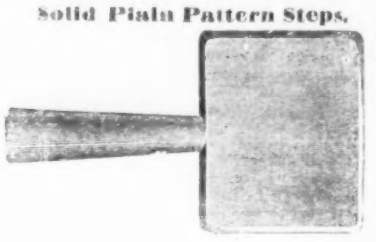


Star Pattern.

Smith's Improved Philadelphia Pattern Slat Irons.



Solid Plain Pattern Steps.



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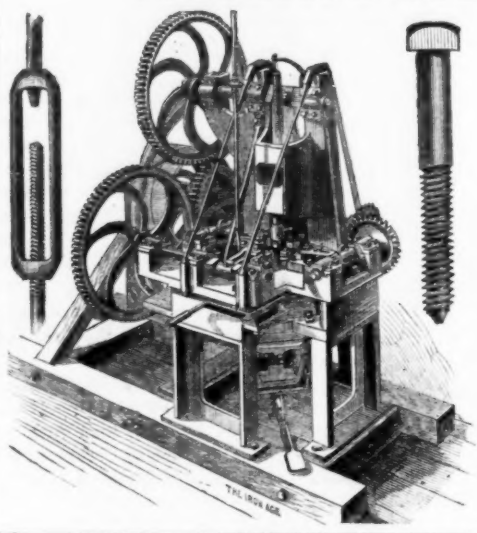

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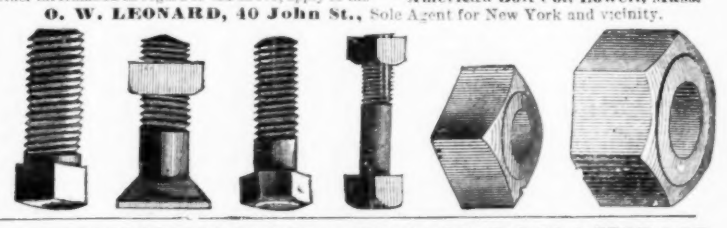

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JOHN S. KING - - *Business Manager.*

NEW YORK, January 2, 1875.

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Thirty-seventh Page.—Chicago, Boston, and St. Louis Hardware and Metal Prices.

The Centennial City.

Much of the early opposition to the celebration of our national centennary by an international industrial exhibition, had its origin in a popular dissatisfaction with the choice of Philadelphia as the city in which the exhibition was to be held. The West, ambitious of honors and proud of a rapid and substantial development, thought that Chicago or some point in the Mississippi Valley should have been chosen, as representing more fully than any of the older cities of the seaboard our peculiar and characteristic civilization. On the other hand, New York and Boston were rather disposed to look upon Philadelphia as a second rate city, living upon accumulated wealth, a small local trade and the traditions of a more prosperous past. This feeling was, perhaps, natural. Philadelphia has not, until within a few years, felt the inspiration of progress in the same degree as other and younger cities. It has made but little noise, and to the casual observer seemed to be standing still, rather than growing in influence and importance. Of late, however, Philadelphia has taken rapid strides. A new life has quickened all departments of productive and speculative enterprise, the city has expanded on all sides with a rapidity almost without parallel, her manufacturing industries have developed until she has attained a position in the list of manufacturing cities second only to New York, and her population has increased in a ratio more than proportionate to her progress in other directions. There is nothing abnormal nor unhealthy about this growth. The adjective of "mushroom," which has been used with so much truth in describing the growth of some Western towns which have, at best, a dubious excuse for existence, cannot be applied to Philadelphia. As a city, her greatness rests upon a broad, composite foundation. On no one industry, or class of manufactures, is it dependent. The Pennsylvania Railroad has been a powerful agent in promoting the prosperity of the city, but it has not made Philadelphia, nor would a suspension of the traffic of this line, or its diversion to other channels of transportation, rob this substantial city of a vital element of its prosperity.

However regarded, Philadelphia is a city to which we can invite our own people and those of other countries without fear of disappointing them. In many respects it is not great. It has few really good hotels if any; its theatres and places of amusement are of the kind better suited to a provincial town than to a great city, and its journals cannot claim rank with those of the principal Western cities. In other respects Philadelphia is not up to the metropolitan standard, but we may expect a radical change in all these things during the coming year. For the city itself we shall have no reason to apologize. It is a worthy representative of the best elements of our civilization. Foreign visitors coming here with the impression that Philadelphia is a second-rate city, interesting chiefly because of historical memories dear to the American heart, will be surprised to find a city which exceeds in extent, population, manufacturing and commercial enterprise, many of the great capitals of Europe. It has now a population of about 700,000, and covers an area of 82,804 acres, or over 129 square miles. According to the returns of the municipal census, brought up to the end of 1874, the city contained 148,001 houses, of which 135,343 were dwellings, and 10,658 stores or factories. It had 375 miles of sewers, 450 bridges, 650 miles of paved streets, 612 miles of gas mains and 9905 street lights, 628 miles of water mains, 467 public schools attended by an average of 108,631 pupils in the day and night classes; a park of 2740 acres containing 350 acres of water, 20 miles of walks, 32 miles of carriage way and 10 miles of bridle path. The taxable value of property within the city limits is $575,288,968. A city of this size, further increased in population by the inflow of a multitude of temporary residents and transient visitors, with a splendid railroad system, a growing foreign commerce and a steam marine owned by local capitalists, will be apt to surprise those expecting to find a "provincial town."

At present the city has no means of providing suitable accommodations for the multitude of visitors expected next year. Arrangements are now in progress, however, which will meet this difficulty, and protect visitors against extortion and imposition. Through a central agency managed by well known and responsible gentlemen, householders willing to let lodgings are registered, and boarders are assigned to them. There will also be temporary hotel accommodations for many thousand of transcient visitors. The feeling among all classes of the people of Philadelphia seems to be that the credit of the city demands that visitors shall be protected against the extortions and impositions to which visitors to Paris and Vienna were subjected, and if those who go to Philadelphia will avail themselves of the agencies established for their accomodation, they will probably receive fair and hospitable treatment.

Of the effect of the Centennial upon Philadelphia it is difficult to speak with confidence. Probably its first effect will be to stimulate everything capable of stimulation. This will be followed, doubtless, by a sharp reaction after the close of the exhibition; but there is reason to think that the city will be permanently benefited, and that ten years hence it will be a greater city than it would have been had the Centennial been held some where else. At all events, the country at large will hold the "Quaker City" in higher esteem after the Centennial than now, and its substantial greatness will be better appreciated when better known.

Accidents on English Railroads.

In 1874 there were 168 investigated train accidents in Great Britain, against 241 in 1873 and 238 in 1872. The returns for the three years are tabulated as follows:

CAUSES.	No. of Cases.		
	1872.	1873.	1874.
Fracture or unloosening of couplings	4	4	5
Defective maintenance of rolling stock	11	15	8
Defective maintenance of road or works	16	24	13
Defective construction of rolling stock	11	12	8
Defective construction of road or works	4	6	4
Insufficient or defective accommodation for the requirements of traffic	13	37	18
Insufficient establishment, long hours or inexperienced servants	7	17	1
Insufficient brake power	8	12	6
Defective arrangement of signals or points, or want of or defective locking apparatus, or want of safety points or locking bars or bolts	71	78	49
Insufficient or inadequately enforced regulations	11	33	24
Defective system for securing intervals between trains, or want of telegraph communication or of block system	42	59	39
Negligence, want of care, or mistakes of officers or servants	180	182	126
Excessive speed, having regard to engine, road, or other circumstances	16	12	9
Foggy or stormy weather or snow storms	14	22	29

The classification of these accidents strikes the American as somewhat unusual, inasmuch as the reasons for the accidents and not the accidents themselves are stated. Under the first heading of the fracture or unloosening of couplings, we have a commentary upon drawbars and links, and the weights of trains. Five accidents seem to have been caused by a failure of couplings. This is a very small number, and is due to the fact that the screw couplings under compression are used. This form of coupling is not only stronger than the link and pin employed here, but it is subjected to less severe shocks, and, as the trains are very much lighter, we naturally expect fewer accidents from the breaking of couplings.

The screw coupling cannot be introduced here for several reasons; it takes more time to handle a train with them than with the link and pin coupling, or else more men; the system could not be used in connection with the cars already on our roads; lastly, it is very much more expensive at first. Whether the first cost would not be met by an increased saving of links and pins is questionable. The moral to be drawn is that, in this country, we must have a better method of car coupling that will prevent the breaking of trains. Probably some of the plans now under trial will, when improved, give us a solution of the problem.

The next four items strike us as being large, in view of the fact that England boasts of the perfection of her road bed and its maintenance, as well as of her railway rolling stock. Thirty accidents from these causes seems to be a larger proportion than is reasonable. Comparison with this country under this head is impossible, because, in reporting accidents here, the ultimate reasons are rarely given. An accident happening from a broken rail would be reported as caused by the breakage, but no reason would be assigned for the breakage, at least none that would involve the question of maintenance of the way; and so in the breakage of a wheel or a truck. Had the railroads of this country a system of reporting and investigating that would go to the bottom of every accident of importance, a vast deal of information could be obtained that would assist greatly in the prevention of similar accidents in the future. To the steadfast determination on the part of our railroad men to prevent losses of life, may be traced the small number of fatal accidents in this country. The means of carrying out this determination would be vastly increased if a thorough investigation took place each time life was lost upon railroads, and the causes ascertained.

The insufficent accommodation for traffic, we presume, is a much more fruitful source of danger in England than America, for our railways are not often so crowded with traffic as to cause serious inconvenience or accident by reason of a want of accommodations. Yet here there is no means of comparing the accidents of the two countries. In England the immense traffic on short lines, naturally resulting from a large population in a very limited space, produces a crowding of traffic not common in this country. Insufficient, brake power, it seems, caused six accidents. We are inclined to think that this is, by no means, a fair statement of the case. Probably a very large number of the accidents recorded under other heads could have been avoided had the trains been well provided with brakes. Such cases do not appear in the table. Probably many of the 39 accidents under the head of "Defective system of securing intervals between trains," could have been prevented by the use of power brakes, the same could probably be said of the twenty-eight accidents happening from "foggy or stormy weather or snow storms. As power brakes are more generally adopted, it will be found that accidents of all classes will be reduced, both in number and severity, so that the saving will be a double one. Really, the wonder is not at the number of disasters, but at their rarity. It seems amazing that, with the light rolling stock used abroad, and the small brake power provided, accidents are not more frequent and more deadly.

Want of discipline in railway management seems to be the cause of a great many more accidents than the compiler of the table is ready to acknowledge. Inadequately enforced regulations, 24; negligence or want of care, 126; defective system, want of telegraphic communication or of block system, 39, making a total of 189, are all probably due to defects in, or the want of, discipline. Here, again, there is no means of comparing the results of railway management of the two countries, but we are inclined to think that our system must be better than theirs, because of the good results attained here in spite of the greater dependence placed upon it, coupled with a lack of those mechanical safeguards upon which so much reliance is placed in England. From merely superficial knowledge, we should be inclined to think that a better class of men are obtained for railroad work here than in Europe, and consequently the greater intelligence of the employes enters as a factor into the question of safe working. This is problematical, but at the same time circumstances make it seem probable.

In most points there is a gratifying decrease in the number of accidents, not only over 1872 but also over 1873. The latter year was, it seems, peculiarly unfortunate, showing in all respects a large increase over 1872. While 1874 shows a decrease over both 1872 and 1873 in most points, there is an increase over 1872 in the matter of "Inadequately enforced regulations" of more than 100 per cent. This does not promise well for the future, and as the business increases, the trouble from this source will become more serious if great care is not taken. The troubles complained of a few years since, arising from long hours, insufficient number of hands, and inexperienced servants, have been greatly reduced, and before long we may expect to find this item stricken from the classification of causes of accidents. Compared with previous years, the record for 1874 is very satisfactory.

Our Navy.

During the past few years it has been, we should judge, a standing rule in a majority of our newspaper offices to ridicule the navy when all other topics, have been exhausted. There never has been, and certainly is not at this time, any occasion for this reckless and unreasonable fault-finding with our naval establishment. While our fleet is small, and lacks entirely the sea-going iron-clad ships considered essential among foreign nations, yet the purposes for which, in times of peace, we need a navy, seem to be amply met by the ships which we have. The total number now on the register is 147, of which 26 are sailing vessels and the remainder are steamers, tugs, ferry boats, monitors, etc. There are 95 steam vessels, not including iron-clads and torpedo boats; of these 25 are tugs, ferry or torpedo boats. The sailing vessels, according to latest accounts, seem to be all profitably engaged in various services, except, perhaps, the old New Orleans, on the stocks for 50 years at Sackett's Harbor, and two others which are laid up in ordinary. Thirty-two of the most important and valuable of the wooden ships are in active service, cruising at home or abroad, or in use as training ships. Our isolated position and peaceful relations with other countries, render it extremely improbable that, for a long time to come, we shall be called upon to use our navy in actual war. In case of an emergency we could bring into service on our own shores, in a short time, a fleet of at least 40 cruisers, carrying over 500 guns, beside 15 iron-clads and 2 iron torpedo ships. More than one-half of this force is already in commission.

Whatever may be said of the power of European navies as compared with ours on the high seas, ours could not be successfully attacked on our own shores by any foreign power, because, though inferior to foreign vessels at sea, they are admirably adapted for coast defense, having a lighter draught and heavier guns than those commonly carried by European vessels of the same class, and also much heavier armor. While we must admit that we should be almost powerless to attack a first-class European navy, we are in a good position to resist attack. The ships themselves are generally good examples of the types to which they belong, and we may be proud of them. Even in these days of iron and steel, live oak is a desideratum in the creation of a navy, and will continue to be so until we find some equally light, tough, elastic and durable substance to take its place. It is absolutely necessary to secure as great a quantity as possible of our sea shore live oak. The rapid deterioration of all of our vessels built of other wood constantly warns us how invaluable is this timber now so rapidly passing away. It is the growth of centuries, and when once gone will never be replaced. The supply is rapidly exhausting. The department has been endeavoring for the last few years, whenever it had the opportunity and the means, to secure what could be had for the present use, or to be laid up to season for the future use of the navy.

In some quarters there seems to be a marked prejudice against the torpedo system. Its value, however, is acknowledged by foreign powers, and they are making every effort to keep up with American progress in this direction. Even if this system of warfare is not successful when used aggressively, it certainly presents such an obstacle to the free operations of a fleet that it is entitled to be regarded as a very efficient portion of the coast defense. From what has been made public, however, it would seem that the field for torpedo attack has been vastly increased by the new inventions which have given us so perfect a control over the direction and speed of torpedo boats.

While the Ordnance department has been engaged in arming our men-of-war at home and abroad, experiments have at the same time been made tending to the improvement of our guns, both light and heavy. While we are not ready to go, like Great Britain, into the manufacture of large and costly guns, it is proposed to arm our ships with rifles converted from smooth bore 12 inch guns—an arm proved to be both effective and durable. Recent experiments have proved that this conversion can be made with safety and certainty.

To sum up the navy is not very strong in the number nor in the classes of its ships, but what there are of them are in good condition. A far larger proportion than usual of our wooden ships are ready for service. Our iron clad fleet is efficient, our store houses are fairly stocked with ordnance equipments and supplies, and we have on hand a fair supply of the best material for the repair and building of ships.

Make a Note of It.

Those who have never tried the experiment, rarely appreciate the benefit which an enterprising, progressive mechanic derives from keeping a record of matters worth remembering. An intelligent workman, especially one who reads, is constantly acquiring interesting and useful information, which at some time he will probably have occasion to apply practically in his business. Almost every day he learns something new, and says to himself, "I must remember this;" but unless he has occasion to immediately apply his knowledge, he is very apt to forget all about it, or to retain only a vague recollection of having at some time read or heard something about it. The memory, unless highly trained and naturally retentive, is a treacherous repository for odd scraps of useful knowledge not gained by experience or personal observation, and every mechanic should have a "paper memory" which will never let a useful fact slip away.

We should advise all mechanics, and especially all young men with unformed habits who are learning mechanical trades, to keep note books in which to enter anything worth remembering which may come to their knowledge. Facts learned from observation and experience, or gathered from conversation with other mechanics, useful hints gained from books, valuable suggestions or facts of practical interest found in newspapers, should always be promptly recorded and saved. When a book is full it should be carefully indexed and laid away in some place where it will be easy of access. The mere fact of writing, especially if condensation is required, will tend to fix a fact in the memory, and give a man a more ready control of what he knows. In any case, he has the fact at command at all times, and a book such as we have described, containing the gleanings of years of study and practice, becomes of inestimable value to the possessor. We have seen mechanics' note books which would not have been given in exchange for a whole library of technical works, and we have never known a man to begin the recording of facts who was not glad he had acquired the habit.

We regard this as a matter of great practical importance to mechanics in the trades we especially address. No printed text

books contain all the "points" which a smart mechanic will pick up in the course of his business, and nothing will take the place of a scrap and note book. Let our readers, young mechanics especially, try the experiment, and we promise them that they will find immediate and life-long benefit from so doing. It will be to many the stepping stone to success in life, by inculcating careful habits of acquiring useful knowledge, and making them wiser men and better mechanics than they would otherwise have become. To all young mechanics we say—never let a fact worth remembering slip away from you. Make a note of it in some shape, and then put it where it will be accessible when you want it most. The habit is easily acquired, it need consume no time required for the performance of other and more important duties, and the pleasure which it will give will more than compensate for the trouble involved, even were no subsequent benefit to be expected from it.

The Pittsburgh Boilers.

The fear of another strike, growing out of the disputes between the mill owners and boilers of Pittsburgh and vicinity, has, we are glad to learn, been set at rest for the present by a compromise. This encourages the hope that both parties to the endless wages dispute in that market are learning wisdom from experience. On Saturday last representatives of the masters and the men met in amicable conference, to consider the questions under dispute. At a meeting held the previous evening, a willingness to compromise was expressed by both sides, and in this spirit the following resolution was agreed to, and signed by Mr. Joseph Bishop on behalf of the boilers, and Mr. Henry W. Oliver on behalf of the manufacturers:

That on and after Monday, December 13th, until the 14th day of February, 1876, the price for boiling shall be $4·75 per ton. It is understood, however, that any mill whose notice has not expired shall continue to pay $5 per ton until the expiration of the agreed thirty days.

This settles a vexed question for the present. We have not much faith in the principle of arbitration, but we look for important and permanent benefits from conferences between masters and men. If the workmen in any trade go out on strike, we counsel a vigorous and determined resistance on the part of employers; but when they ask for a conference, in which the questions at issue between them and employers can be calmly and dispassionately considered, the request should always be granted in a liberal and friendly spirit. Much of the trouble which has hitherto existed between masters and men has arisen from the want of a full and fair understanding between them. When this is reached we shall look for fewer strikes, and the demagogues who now thrive by fomenting discord and strife, will find themselves compelled to earn their living by work of a different and less agreeable kind.

Iron Workers in the Olden Time.

From the earliest times, the workers in iron and steel have been among the most important of all the working classes. War and peace alike turn to them for aid, no less so now than in former times. In one of the earliest records of wages which have come down to us, and which is an edict of the Emperor Diocletian, A. D., 301, we find that the ironsmith was paid 25 cents per day, and the armorer received 12½ cents for restoring the edge to a sword, polishing a helmet or repairing an axe. While these prices seem exceedingly small, yet, as money had a much greater purchasing power at that time than now, they are not as low as they would at first seem. Compared with those received by other artisans they were good The same edict also regulates the prices of various articles—a scale of prices which could not be exceeded in years of scarcity. Eggs, 4 for 2 cents of our money; figs, 25 for 2 cents; dates, 8 for 2 cents; second-rate dates, 16 for 2 cents. Various grains were about $1 per bushel; bruised peas, $1·02 per bushel; kidney beans, $1·02 per bushel; barley, 84 cents per bushel; whole beans, 61 cents and a fraction per bushel; bruised beans, $1·02 per bushel. The prices were too low, however, and after a time the attempt to enforce them was abandoned.

The average price of wheat from A. D. 306 to 374 was from $1·23 to $1·20 per bushel. This price was an average covering a considerable number of years. From this it will be seen that the wages, which seem so low, had really no mean purchasing power. Even at this early day we find labor arranging itself in a manner not unlike that of the present time. Trades unions were formed in Rome at a very early period. The original unions were the result of spontaneous action of the workmen. The first laws upon the subject were those which we find in the twelve tables, directing that the rules of the unions should, in all cases, conform to the general laws of the state. In course of time, however, the trades unions came under government patronage, and formed a very important part of the service; they were, in fact, the frame-work of bone which supported the great Roman body. Among the industrial unions which we find mentioned in the year 337, are: Gravers on copper, blacksmiths, founders, goldsmiths, looking-glass makers and plumbers. The founders were probably workers in brass and copper; the blacksmiths working, as now, in iron and steel. We presume the looking-glass makers were really manufacturers of metal mirrors, rather than of looking-glasses of silvered glass such as we have at the present day.

In the wreck of the Roman empire the manufacturers of arms and the iron workers in general were still necessary to the existence of the invading nations, as they had been to Rome itself. From the specimens of work which remain to us from those ages, it would seem that little, if any, skill was lost until a comparatively recent date. In the middle ages specimens of work were made which to-day tax our ingenuity in guessing at the methods by which they were produced. For example, we have ornamental iron work which puzzles us to decide whether it is wrought iron or cast iron, or both, and which may possibly come under the head of malleable iron.

Definite prices for metal work, given something like a thousand years later than the time of which we have just been speaking, show that values had materially increased. Thus, a brass pot varies from 1/ to 2/6; a brass cup, from 6d. to 1/; an andiron, from 3½d. to 8d.; a brass dish, 6d. to 1/; a gridiron, 6d. to 1/6; a broad-axe, 3d. to 5d.; the square was 1d.; an adze, 2d. A blacksmith's tools were valued at from 2/ to 5/. These prices, however, are probably considerably below the real value of the articles. The amount of household furniture at this time was exceedingly small, consisting usually of a cooking utensil for boiling, and a bed, or bundle of straw, upon which to sleep. The valuations here given are those of about the year 1300. These prices, though seemingly small, were such as to enable the artisan to live vastly better than his brother, the farm laborer, 150 years later than this. The wages of a common farm servant were but 15/ a year, with food and drink, and 3/4 for his clothing. The prices of cheese for the two dates were half a cent to three-quarters of a cent. per pound; butter averaged about 4 cents a pound, and eggs 4½ cents per 100.

Little can be said in regard to the price of labor from this time until the reign of Elizabeth. In the thirty-eighth year of her reign we find that the smiths, according to an official order regulating the price, were to receive £1. 11/8 per year; this price included meat and drink, but without meat and drink they received £5; while the daily wages, without board, as we say at the present day, was 2d. per day. The plow wright received only £1. 10/ and his board. Pewterers received, with board, £1 per year, and while they received but 13/4, without board, their wages per day were ½d. higher than those of the smiths. Until the early part of the eighteenth century, changes of the prices and the relations of the trades to each other underwent little alteration. Progress was constantly made in the direction of an increased production, better wages and a general rise in the value of farm produce. The modern epoch of wages and labor may be said to date from the introduction of power in place of manual labor. The latter half of the eighteenth century is commonly said to mark the era of machinery, but practically this era was inaugurated by the introduction of the crude inventions of the Marquis of Worcester, Savary, and the other developers of prime motors; and though we usually regard the birth of the steam engine, and the general introduction of power, as having taken place in the time of James Watt, it was really a gradual development, whose beginning is out of sight in the mists of the previous century.

Ancient and Modern Aqueducts.

The Cleveland *Trade Review* compiles the following interesting facts respecting great aqueducts:

Familiar as the last half century has made us with vast economical erections, we cannot look back to the aqueducts of the ancients—those stupendous tiers of arches upon which they conducted their supplies of water across valleys and rivers—without regarding them with curious interest. Though remains of aqueducts or water courses are yet to be discerned in Syria, Persia and other eastern countries, it was only among the Romans that the construction of such works was carried to true magnificence and perfection, and this not only for the supply of their own capital, but also for the benefit of the chief towns to their subject provinces. The aqueducts of Rome extended 30, 40 and even 60 miles from the city, in one continued covered channel of stone, carried by arcades over the deepest and widest valleys, and by tunnels, running in many parts for miles through mountains and through the solid rock. Frontinus, who was curator of water works under the emperior Nerva, mentions nine aqueducts by which the city was supplied; five more were added by Nerva; and the number was afterward augmented by succeeding emperors to 20. In one part of the New Anio is said to have extended six miles and a half in one continued series of arches, many of them upward of 100 feet high. The Aqua Martia, which owed its formation to Quintus Martius, rose from a spring 33 miles distant from Rome, made a circuit of miles and afterward forming a vault of 16 feet in diameter, it ran for 38 miles along a series of arcades at an elevation of 70 feet, making in all not fewer than 7000 arches; the Aqua Julia and the Aqua Tepula were brought to Rome by the same aqueduct as the Aqua Martia, but on higher levels. The whole aqueduct above the arcades was divided into three stories or channels. In the uppermost flowed the Aqua Julia, in the second the Aqua Tepula, and in the lowest the Aqua Martia. From the ruins of this combined fabric which still exist, it appears to have been a very superb structure. The Aqua Claudia—begun by Nero and completed by Claudius—took its rise 38 miles from the city. It formed a subterranean 36¼ miles in length, ran 10¾ miles along the surface of the ground, was vaulted for the space of three miles, and supported on arcades through a space of seven miles, being carried along as high a level as to supply the hills of Rome. It still continues to furnish the modern city with water of the best quality, which has hence procured it the present name of Aqua Felice.

Of the provincial aqueducts which still remain as relics of Roman grandeur, the most remarkable are the aqueducts of Metz, of Nismes, or the Pont du Gard, and that of Segovia in Spain. The former is now greatly dilapidated; but there still remain a great number of arches, and enough to give an idea of the whole. It extended across the Moselle—a very considerable river, and very broad in this place—and served to convey the delicious water of the Gorse to the city of Metz. These waters are said to have been very sufficiently abundant to float vessels every time that a naval fight was to be exhibited. They were carried across the Moselle by means of the aqueduct, which was situated about six miles from Metz, and from thence were conducted under ground, in stone channels similar to the others, to the city, to the baths, to the place of the sea fight, and for the use of the inhabitants. This aqueduct seems to have been about 1000 feet in length, the arches 50 feet high at the deepest part, and 50 in number. The Pont du Gard—that part of the aqueduct of Nismes which crosses the deep valley in which the Gardon flows—was executed in the reign of Augustus, and is one of the noblest remains of Roman architecture among the Gauls. It is composed of three ranges of arches, one above another. The first row comprehends six arches, each 60 feet span; excepting one which was the largest, and was 75 feet span, the second row contained 12 arches of the same span as those of the first; and the third had six little arches, on the top of which was the channel for conducting the water. The total hight of the structure above the water was 160 feet and its length 300 yards. This structure, though destroyed in the fifth century, was still in such a state of preservation in 1740 as to be converted into a roadway by widening it, or rather by building in a manner another bridge to the side of it, having all the arches of the same span and dimensions. Of the aqueduct of Segovia, there still remain 159 arches, all built of large stones, and without any cement. There are two tiers, and the entire hight of the edifice is 102 feet.

The great aqueduct of Spoleto, constructed in the year 741, by Theodoric, king of the Goths, to communicate with the town of Spoleto, remains entire to the present day. In crossing the river De La Morgia, the channel way is supported upon two arches, the lower containing 10 and the upper 30. The length of the arcade is 800 feet, the breadth 44 and the hight 420. The aqueduct of Caserta, built in 1753 by Charles III., of Naples, is also a gigantic structure, one of its arcades consisting of three tiers of arches 1824 feet long and 190 feet in hight. That of Lisbon, completed in 1738, is also no mean structure. It is about three leagues in length, and in some parts of its course has been excavated through hills; but near the city it is carried over a deep valley for a length of 2400 feet by several arches, the largest of which has a hight of 250 feet and a span of 115. Of the modern aqueducts in France, that which conducts the waters of St. Clement and Du Bouhdou to Montpellier is perhaps the most beautiful. It was built under the superintendence of M. Pilot, and required thirteen years for its completion. The principal arcade is 90 feet high, and consists of two tiers, the lowest containing 90 and the upper 210 arches.

The Croton aqueduct conveys the water of the Croton River, for a distance of 38 miles, to the city of New York. This aqueduct was finished in 1842, and was capable at this date of discharging 60,000,000 of gallons in 24 hours. The chief arcade in its course is that of Harlem, which consists of 15 arches, seven of which are 50 feet span and eight of 80 feet, the greatest hight being 150 feet from the foundation.

We are informed that Mr. P. Cunliffe Owen has resigned his commission as British Executive Commissioner at the Centennial Exhibition. This announcement can hardly fail to be received with profound regret in this country, for during his recent visit to the United States on business relating to the British exhibitors he won a high measure of admiration and regard from all Americans who were thrown into contact and intercourse with him. His resignation will, therefore, cause deep disappointment as well as regret, and if the step is one that can be recalled, it is most earnestly to be hoped that it will be reconsidered. For the present, the resignation of Mr. Owen has been provided for by the appointment of two other gentlemen to exercise his functions with respect to the Centennial Exhibition, viz.: Colonel Herbert Sandford, of the Royal Artillery, hitherto "Official Delegate" to the Centennial, and Professor Thomas Archer, Director of the Edinburg Museum. The former is already well known and esteemed in this country from his recent visit, and Professor Archer had experience at the Vienna Exposition.

The Deer Lake Furnace.

The Marquette *Mining Journal* has the following:

In the summer of 1867 a company was organized at Norwich, Connecticut, for the purpose of building a furnace at Deer Lake, and Messrs. E. C. Hungerford and John B. Ward were sent out to take charge of the work of construction. The company had previously secured a most valuable tract of contiguous hard wood lands, including the present site of the furnace. The first desideratum was to secure an abundance of fuel with a sufficient water-power that could be utilized at the smallest possible expense, and this the company found in the purchase of the Deer Lake tract The Carp, which at that point is a stream of considerable volume, has a perpendicular fall of fifteen or twenty feet, and furnishes a never failing power, which was utilized at a cost comparatively insignificant. It was decided to locate the furnace immediately at the foot of the falls, and work was accordingly commenced about the first of September, 1867. The stones for the stack were quarried so near its base that a derrick was all the appliance necessarily used in transferring them from the quarry to their places in the wall. Though well and substantially built, it was, perhaps, the most cheaply constructed of any furnace in the district. The stack, as originally built, was 38 feet high with 7 feet diameter of boshes. It was first blown in about the first of September, 1868. In the summer of 1872 the iron broke out through the arch under the tuyere, setting fire to the buildings which were totally consumed, leaving nothing but the stack and hot blast oven standing. With characteristic energy, Mr. C. H. Hall, then the managing agent, commenced clearing away the debris before the flames had ceased to act upon the larger timbers, and having succeeded in drawing the charge without permitting a salamander, he had the buildings reconstructed and the furnace again at work before the expiration of five weeks. Subsequently the stack was raised to a hight of 47 feet, and the diameter of the boshes increased to eight feet. As it now stands, it is what might be termed a hermaphrodite stack, the lower half or two-thirds being of stone, and the upper half or one-third an iron shell. It has a closed top, with bell and hopper.

In 1873 a second stack was built, which went into blast February 1, 1874, and continued blowing until the 1st of April last. This stack is 9x47 feet, an iron shell, and while in blast did excellent work, making in a run of fourteen months, on one hearth, 7863 tons of iron, of which only 311 tons were high grade, and all of which was sold to the North Chicago Rolling Mill Company for Bessemer purposes. The blowing cylinders which furnish the blast for both stacks are two in number, 32x60 inches, with five feet stroke. The crusher and hoist are run by power transmitted by common manila ropes over shieve pulleys.

No. 1 has now been in blast twenty-seven weeks, on a new hearth, in which time she has made 2950 tons, all No. 1 Bessemer, except about 50 tons. She has made since first blown in 17,098¾ tons, adding to which the 7863 tons made by No. 2, gives a total product of 24,948¾ tons. No. 1 will be blown out on the first of March, if not sooner. It is the intention to use up as closely as possible the wood on hand, and when that is done the furnace fires will be extinguished, not to be relighted until a change for the better in the iron market warrants such a course.

Opposite the furnace the company have a saw mill, with planing mill attached. This saw mill has a capacity of about 16,000 per day, and has cut this year, up to and including the 7th inst., 1,895,343 feet, a ready market for which is found at points along the line of the M., H. & O. R. R. The landed estate of the company comprises a solid, compact tract of 8000 acres, upon which there is a large amount of valuable pine, in addition to the hard wood. So far, the consumption of pine has been confined to the lands cut over for furnace purposes, the "pinery" not having been reached. The suspension of operations at the furnace will not affect the mill, which will be kept running so long as there is a demand for its product.

A wooden tram road from the furnace to Ishpening, with T rail on the grades, furnishes cheap transportation of ore to the furnace, and for the pig metal to the railway depot. This tram road is about one mile and a half in length, and most admirably serves the purpose for which it was intended.

The furnace "location" consists of about 50 buildings of all kinds, the dwellings being particularly neat and comfortably looking.

It having been announced that the furnace would blow out, an impression growing out of that fact exists in some quarters that the company is embarassed financially. So far from such being the case, we are most reliably informed that while the company owes but a small amount to its laborers, its property consisting of the furnace plant, mill and valuable landed estate, is wholly unencumbered, and that it has now on hand enough iron to pay all outside indebtedness, even if sold at present prices. The furnace has made money every year since starting, with the possible exception of the present, and we believe there are few corporations in the district that are more financially sound than the Deer Lake Iron and Lumber Company.

In closing this hastily written screed, we cannot forbear saying a brief word in commendation of Mr. E. R. Hall, the company's agent. Mr. Hall is the youngest furnace manager in the district, having succeeded to the position when his father, C. H. Hall, Esq., assumed the general agency of the Lake Superior Iron Company. His close attention to the business affairs of the company, together with the skill displayed in the working of the furnace—hardly to be expected in one so young in years—is a subject of general and complimentary remark.

Bridge Building on the Pacific Coast.

The San Francisco *Scientific Press* contains the following:

The rapid advance made in the civilization of the interior counties of the Pacific States has rendered necessary the construction of bridges to span the multitudinous streams which wend their way to the seaboard. The inestimable qualities of iron in the construction of bridges has been acknowledged to be chief among the essentials that go to make up a solid, convenient passage over streams; but the heretofore, and still existing, high price of iron in adaptable shape for the purpose has caused science to examine into the utility of less costly material, and led ingenious men to devise such methods as to equal, in many respects, the greater tensile qualities possessed by bridges constructed exclusively of cast or wrought iron. While cast iron is remarkable for rigid, inflexible nature, wrought iron becomes superior on account of toughness. A number of such bridges now span our streams, but their value, in point of cost, makes them not only undesirable, but impossible to be employed generally.

In order to remedy any deficiency that may exist in the want of metal, wood has been employed in the construction of bridges with such success as to make the want of iron a matter of no great moment, with exception of where wide rivers or streams are to be spanned, and when the span must possess great tensile power or ability to bear the weight of innumerable tons. On the Pacific coast no greater success can be instanced than that exhibited in the wooden structure, controlled by the Pacific Bridge Co., of this city. We allude to the "Smith patent truss bridge," which is composed almost exclusively of wood and adapted to the span of wide streams. This bridge is capable of forming a span varying from 230 to 275 feet, perfect safety demonstrated by numerous practical tests, and capable of resisting the load of one ton to the lineal foot As every locality, and object of bridge, suggests to the engineer the condition of its practical working capacity or power to uphold the passage of heavy weights, so the character of the bridge we name is determined according to the span necessary to unite two divided objects or divisions of land.

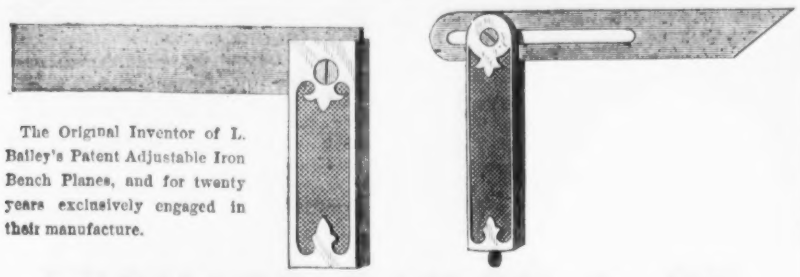
The Smith patent truss bridge possesses the requisite tensile qualities, as well as those of an æsthetical character. The latter is only secondary, as the utility of the bridge to span wide streams is the main object, and the cause that can be assigned for the superiority of this bridge over all similar wooden structures on the Pacific coast. In almost every county in California, and also in Oregon, this bridge may be seen in different lengths and widths, every instance of them affording corroboration of their superior nature. The company possesses the sole right of the bridge named on this coast.

The Pacific Bridge Co. was organized at Oakland in 1872, under the efficient Mr. W. H. Gorrill, as president, and Mr. C. H. Gorrill, secretary and treasurer. The business increased so rapidly that a removal of the office and works shortly after to this city was deemed necessary. The sphere of this company's operations increased wonderfully, and until they extended to the manufacture and building of wooden and iron bridges, wharves, gates, dams, and all kinds of heavy framework. Also sole agents for Smith's patent truss bridge; King Iron Co., Cleveland; Smith's iron combination bridge, of Toledo, Ohio, etc. The works are located at the corner of Fourth and Berry streets; office, No. 606 Montgomery street, in this city.

The company employed the last summer, on an average, upward of 250 men, in the several occupations we have named. One of their late works was the construction of the Oakland brick sewer, which has been pronounced by competent engineers equal, if not superior, to any similar work in the United States.

This company has at its head gentlemen of practical knowledge, skill and efficiency to devise means for the successful accomplishment of any work rendered necessary by circumstances and where such necessity becomes obvious. Such are Mr. C. H. Gorrill, president, and Mr. R. W. Gorrill, treasurer, whose wide practical experience in the art, and comprehensive knowledge regarding works of the character named, is attested in the performance of some of the most difficult undertakings ever accomplished on the Pacific coast.

The Cleveland *Trade Review* says that Messrs. Brown, Bonnel & Co., of that place, have just completed the erection of a foundry and machine shop, located near their Phœnix Furnace. The machine shop is now running, and they expect to be at work in the foundry the latter part of next week. This firm has paid an immense sum of money for machinery, which they propose manufacturing hereafter themselves. In fact, they can now manufacture all kinds of machinery needed in their mills except chill rolls.



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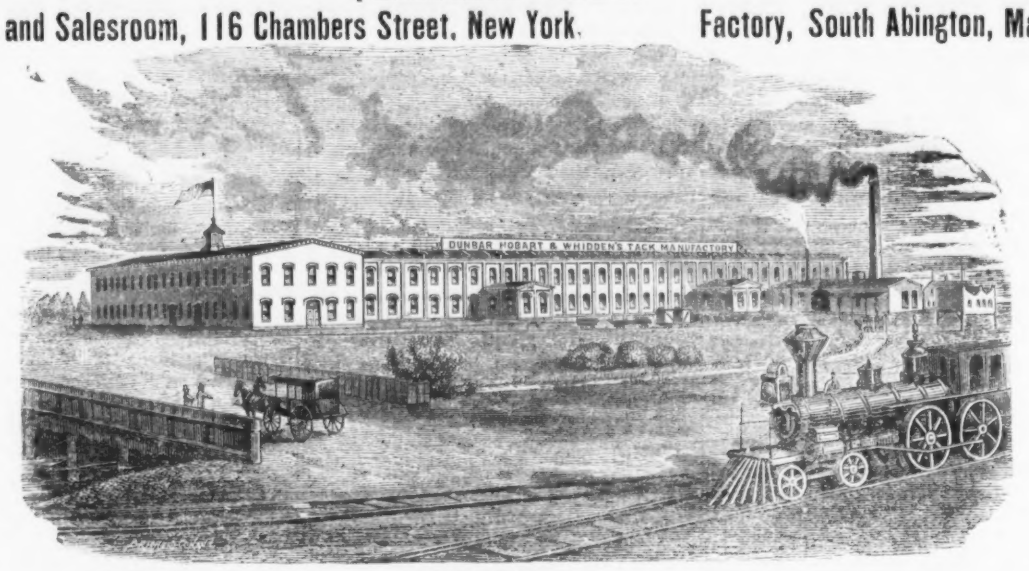

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Heel and Toe Plates, Steel Shanks, and Fancy Head Nails, Silver or Japanned Lining and Saddle Nails.

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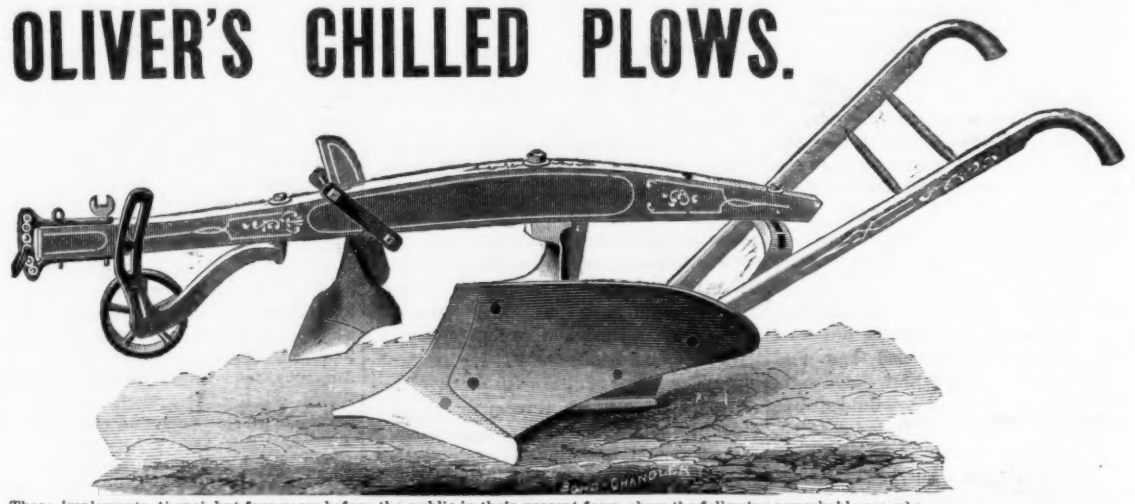

These implements, though but four years before the public in their present form, show the following remarkable record:

1506 were sold in the season of **1871.** **7472** were sold in the season of **1873.** **30,000** will be made for the season of **1875.**
3049 " " " **1872.** **14,976** " " " **1874.**

For full descriptive circulars, address,

SOUTH BEND IRON WORKS, South Bend, Ind.

CLARK'S PATENT EXPANSIVE BITS

Made of JESSOP'S BEST CAST STEEL, and warranted superior to any other.

Two sizes: Large Size Boring, ¾ to 3 inches; Small Size Boring, ⅜ to 1⅝ inches.

Manufactured by

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The National STOVE POLISH.

This Stove Polish is a strictly pure article, free from all adulteration. It will polish with the greatest ease, and give a brilliant and durable lustre.

NATIONAL STOVE POLISH CO.,

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The Sugar Maker's Friend,

PRICE, $4.50 per hundred.

More agents wanted to canvass for the sale of **Post's Patent Galvanized Metallic Eureka Sap Spout and Bucket Hanger.** Samples, Circulars and Terms sent on receipt of 20cts to pay postage. Address,

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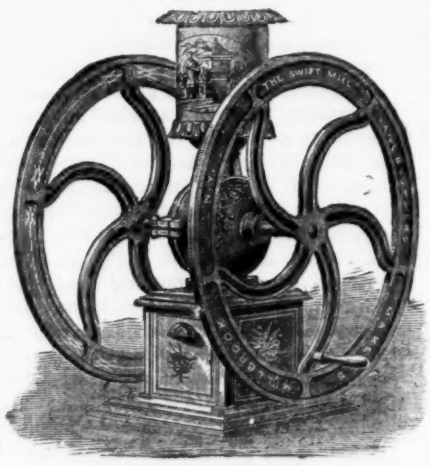
SWIFT MILL.

ESTABLISHED 1845.



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The annexed cut shows one of the many styles of Coffee Mills of our manufacture, especially adapted to Grocers' use and all retailers of coffee. They are highly ornamental, and workmanship of the very best. Silver Medal awarded at the Great Fair of American Institute last autumn. We make more than 30 styles.

ALSO

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Will roast 30 to 40 lbs. at once, and can be used as a stove at other times.

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ARCHITECTURAL IRON WORK.

BY WM. J. FRYER, JR.

PART V.

(Continued.)

Specification of iron work and materials and labor required to build and complete a ——— to be erected on lot —— No. —— street, for Mr. ——— Owner.

In accordance with this specification and the accompanying plans, elevation, section and working drawings, made by ———

Architect, &c.

DIMENSIONS.—The size of the building, hights of stories and other dimensions to be obtained from the drawings and the figures thereon.

SCRAP.—Take down and clear away all the old iron from present buildings, and allow the value of same in making the estimate.

FRONT.—The front of the building, from the foundation up to the roof cornice will be made of cast iron as shown on the drawings, including all posts, autaes, columns, piers, jambs, reveals, arches, facias, cornices, capitals, bases, water tables, sills, panels and other architectural features. The posts, columns, etc., upon which dependence is placed for stability will average three-quarters of an inch in thickness. The remainder of the work will be cast of sufficient thickness to retain their shape, none being less than a quarter of an inch in thickness. And the whole securely bolted and properly put together in their several parts. The castings to be smooth, straight, sharp and clean. The ends of all columns to be turned off true and even in a lathe. Columns to have ears cast on at top and bottom, and bolted together with a plate 1 inch thick intervening. Longitudinal ties of 2x⅛ inch wrought iron will connect the columns of each story, with an eye formed on each end of the tie bar, to allow the passing through of the bolts which connect the columns together by the ears. Bolts three-quarters of an inch in diameter and nuts.

The basement posts will rest on plates 1¼ inches thick, planed on top, and to be 4 inches on all sides larger than the posts which rest on them. The plates on top of basement posts will be made with nosings on the front, and sockets on the sides to receive bars for the support of the door sills.

Cast or bolt on necessary brackets, etc., of suitable shape and thickness.

End columns to be each secured with three wrought iron holdfasts, and each middle autae secured by heavy wrought iron anchors extending back about 5 feet, and well fastened to the floor timbers.

The entire front to be done in the most substantial and workmanlike manner.

Each casting thoroughly coated with paint on all surfaces, including bolt holes, to be painted before using. All bolts to be dipped in paint before being used, and all screws, rivets, etc., to be treated in this way as well; carefully scrape away all burs, etc., after the drilling of holes.

The joints made flush and true, and watertight.

Notes.—For a corner building: "The autaes of upper story to continue up to the hight necessary to support roof timbers."

For a double store: "A bracket cast or bolted on to the back of the center front autae on each story to take the end of wooden girders. And these autaes to be each one-half inch thicker than the others are called for in the respective stories."

For a corner building where the floor timbers rest on the return front: "All the front autaes on the side street shall have brackets cast on their sides to receive 7 inch wrought iron beams to support the wooden floor timbers. These beams shall be made to fit snugly between the autaes, and be fastened with angle pieces bolted through the web of the beam."

If only the first story is iron—that is a brick or stone front used above—then specify: "Over the first story columns a box lintel course will be placed, made, say, 20 inches high on face, say, 22 inches on bed, and, say, 12 inches on back, and to average 1⅛ inches thick. The lintels jointed over the center of columns, turned off on ends in lathe true and even, and bolted together through brackets cast in lintels, with two ¾ in. bolts and nuts to each joint. Cornice over lintel course to be thoroughly put up, bolted and bracketed to lintels."

ROLLING SHUTTERS.—The front openings of first story to be fitted with revolving iron shutters of approved make, with all shafts, gearings, cranks, chains, counterweights, guides, grooves and all other necessary fixtures complete, put up in the best manner and left in perfect working order.

The wooden doors beneath the rolling shutters to be covered with sheet iron on the face and edges properly screwed on. In the panels plant on cast iron moldings.

The entrance to loft will be fitted with dwarf doors made in four folds, frames of 1¼x⅝ wrought iron, covered with No. 16 sheet iron, paneled and molded and hung to the iron columns, and furnished with strong bolts and a $15 lock and two keys.

ILLUMINATED PLATFORM.—The steps, risers, platforms and door sills covering front area shall be of approved make of illuminating tile, consisting of cast iron plates seven-eighths inch thick with knobs on top, and 33 double convex lenses set in cement to each square foot of tile. The tile set in cast iron frames, and the latter supported on strong cast iron bearers, beaded on the lower edge. Covering the end walls will be used an iron tile in imitation of the glass. The outside of the walls are to be covered with iron plates extending down below the walk. The exterior surface of frames to be grooved, and edges to be trimmed with nosings. The platform and steps to have proper pitch to the street of about three-quarters of an inch to the foot. That part of the frame which receives the wrought iron doors over elevator will be set on a greater incline, as shown on the drawings. Let into granite a cast iron shoe, from which the first riser will start. The door sills will each be supported on two 3x¾ wrought iron bars, the whole made complete and put down perfectly water-tight and kept so for one year from completion of the building.

The elevator doors to be hung and secured to the cast iron frame, to be made in two folds, with frames of 2x⅛ inch wrought iron and covered with No. 12 sheet iron. Have proper padlock fastenings to secure the doors when shut, and have guard bar of seven-eighth inch round iron for protection when doors are open. Eyes to receive this guard bar to be riveted on at both front and back of doors.

Note.—Sometimes the door sills are checquered plates. Sometimes the risers are plain iron. Sometimes the first riser only is plain, the others illuminated. Sometimes checquered plates are introduced in front of the basement columns, in order to reduce the amount of illuminated work and so cheapen the cost. Sometimes a cheaper platform is required. Then specify: "Cast iron tile glazed with 5½x5½x¾ glass, set in with putty cement and made water tight."

VAULT GIRDER AND COLUMN.—Furnish and set in vault, for support of granite sidewalk, a cast iron girder averaging 1¼ inches thick, made 15 inches high on the back flange, 6 inches on the front flange and 8 inches on the bed; the column underneath the girder to be 7 inches diameter and 1 inch thick, and to have bottom plate 12x12x1⅛ thick, with ring cast on to receive and hold column; the top plate to be cast on column, the plate to have a molded turn-up piece on top to prevent the column from being shifted away from the girder.

Note.—If brick arches and stone flags are used instead of granite, then there requires to be specified: "Vault Beams—to be in number as shown on plan, of cast iron 10 inches on the bed, with center flange 10 inches high in middle and 4 inches on ends. Thickness to average 1 inch. Beams to be made to hook over and lay into girder so that the bed of the beams will be on the same level as the bed of the girder."

INTERIOR COLUMNS.—Inside columns supporting wood girders will be as follows: Basement and first story, 12 inches diameter, 1¼ inches thick. Second story, 10 inches diameter, 1¼ inches thick. All the foregoing to be deep fluted, and have full Corinthian capitals and attic bases, with round shell plinths, four inches high. Columns in third story, 9 inches diameter, 1¼ inches thick. In fourth story, 8 inches diameter and 1 inch thick. In fifth story, 7 inches diameter and 1 inch thick. And these all to have plain shafts, loose Tuscan capitals with egg and dart bed molding, and molded bases.

The columns are all to be turned off true and even on ends. Those for upper stories are to be made with dowel ends to pass through girders. And all to have top plates 18 inches long by the width of girders, and to be 1¼ inches thick.

Under the basement columns place cast iron bed plates 18x18x1⅛ inches planed on top, and bedded level underneath with a small quantity of cement.

The interior columns will be delivered at the building to the framer, who will set them up in place.

Note.—The following applies to a double store:

ARCH GIRDER.—Furnish and put up for the support of the rear wall two cast iron arch girders with tension rods. The top flange of girder to be 16 inches wide and one inch thick. Center web 12 inches high and 1¼ inches thick. To have 20 inch bearings at each end and skewbacks thereat. Rise of girder at center to be 2 feet 6 inches. Tension rod 3 inches diameter of best refined wrought iron, with square heads at ends, adjusted to the girder in the best manner, and shrunk in while hot. These girders to be well bolted together in the center where they meet with four one inch bolts. Also to be properly bolted to the fire-proof column on which they rest.

Note.—Sometimes two rods are used instead of one. Then they are smaller size rods, the two making in section about 50 per cent. more than the single rod. Sometimes *square* rods are used instead of round.

FIRE-PROOF COLUMN.—For the support of the arch girders, provide and set up in place a double fire-proof column made as follows: Outside column, 16 inches diameter, and average three-quarters inch thick, and to correspond in style with the other first story columns. Inside column, 12 inches diameter and 1¼ inches thick, plain shaft, with top plate 2⅛ inches thick cast on. Bottom plate, 24x24x1¼. On the inside column cast on bracket to receive wooden girder. The space between the outer and inner column to be filled in with plaster.

Note.—Sometimes a fire-proof column is used in the basement underneath the first story column, instead of a brick pier. If so, specify this kind of a column to be used both in the basement and first story, and to be strongly bolted together.

SKY-LIGHT.—Curved sky-light over first story extension to be of illuminated tile supported on handsome molded cast iron ribs. To have cast iron molded gutter on top of extension wall with flanges to fit over the thickness of wall. The bottom of gutter to have a fall to one end and to have proper outlet to receive leader.

The leader pipe to be of cast iron 4 inches diameter, running down on the outside of wall, and connecting with the drain pipe in cellar. The joints of leader properly leaded and caulked and made tight. Put a cast iron strainer over leader in gutter.

The end brick walls coped with cast iron and turned down over outer side 4 inches.

Cover the outer face of arch girders and the brick-work of the rear wall above up to the under side of the second story window sills with No. 14 sheet iron, riveted to 2 inch angle iron at top, the angle iron to be furnished to the mason and to be built in the brick wall by him.

Note.—Sometimes the gutter pitches both ways—from the center to each end.

Note.—If a pitch sky-light is wanted then specify as follows:

SKY-LIGHT.—Over the rear extension of first story provide a pitched sky-light formed of wrought iron sash bars ½x2 inches, placed 8 inches apart, with 1¼ inch oval rebate bar riveted on underneath. Front frame bar, 2½x1½; back frame bar, 3x1¼; sky-light glazed with rough plate glass three-eigth inch thick, in sheets as long as the sash bars.

Note.—Gutter, leader-pipe, coping, &c., as before specified. Sometimes the glass is put in carpenter's specification.

FLOOR LIGHTS.—Make and put down in first story floor lights of wrought iron, as per plan. Main bars to be ¾x3, with ½x1 rebates riveted on; cross bars, 1x1, to run through main bars; to have a cast iron border of neat pattern, four inches wide on top, and made with sockets on the sides to receive ends of bars, and to be well fitted around to the floor, and securely screwed down. Glaze with rough plate glass, one inch thick, well bedded in putty.

Note.—Sometimes where a floor-light is very large, 9 inch (or other size) wrought iron beams are used to secure rigidity. The glass used for floor lights is generally 1 inch thick, generally 12 inches wide, and from 30 to 36 inches long. Even side glass should always be used, that is, 10, 12, 14 inches and the like wide, and not 10½, 11, &c.

REAR OUTSIDE SHUTTERS.—Supply to all the rear openings outside shutters in two folds to each window, three panels for those seven feet or over in hight, and two panels for those under seven feet; made with frames of ½x1½, and covered with No. 16 sheet iron riveted to frames with rivets placed about four inches apart, the sheet iron to lap full one inch on the brick-work; to have strong wrought iron strap hinges extending the full width of shutter, and to be well riveted to and through the frames; shutting bars of ½x1¾, built in brick-work; all the shutters to be furnished complete with all required rings, latches, staples, turn buckles, &c.; the shutters of basement, first and second stories to have three-quarter inch square bolts at top and bottom, in addition to the other fastenings; the top bolts to be long enough for convenient reach from the floor below; the bottom bolts to shoot over wrought iron stubs, which must be leaded in the stone window sills; all the shutters to be left in easy working order.

SHUTTER EYES.—Furnish to the mason to build in the wall cast iron brick-eyes for all the rear window openings; three to each jamb for openings of seven feet or over, and two for each jamb of openings less than seven feet in hight.

WINDOW GUARDS.—Front windows at hoistway in the several stories will have guards extending from sill to soffit of windows, made of three-quarter inch round bars placed 5 inches from centers, with top and bottom rail and two center cross bars of ½x2 inch.

Note.—For windows on side street, or for rear windows in basement or first story then specify: Have guards of seven-eighths round wrought iron bars, sharp pointed at head, or with ornamental cast iron heads, extending up to within 4 inches of soffit of window, placed 5 inches from centers and passed through two ½x2 inch cross bars leaded in brick work. The bottom ends of round bars leaded in the stone window sill. Sometimes one window guard is arranged to open on hinges and secured with strong hasp, staple and brass padlock.

ANCHORS.—Provide a sufficiency of strong wrought iron anchors, ties, clamps, etc., of every description that may be required to completely finish the building, including anchors to secure the cast iron front. Beam anchors placed not over 7 feet apart, made of ⅝x1¾ iron with 1 inch round spear bar 12 inches long; the end which is fastened to the beam to be hook shaped, laying over a wrought iron spike driven in side of beam.

Note.—If specifying for a double store, then there is required: Girder straps made of ½x2½ iron, 24 inches long, with wrought iron spikes, two straps to each joint of girder.

Sometimes star anchors are used on the ends of girders, store houses and heavy warehouse buildings requiring them. The star is made of cast iron from 8 inch up to 14 inch diameter. The shank of ½x1¾ wrought iron with bolt end and nut, and punched for spikes.

BRIDLE IRONS (or stirrup irons, sometimes called).—Furnish to the carpenter as required. Bridle irons for all headers and trimmers of stairways, hoistways, floor lights, fire places and flues, made of ½x3 best refined wrought iron, free from flaws and other defects, and furnish wrought iron spikes, of suitable size, to secure them to the timbers.

BOOK VAULT DOORS.—Outside hanging frames 2x⅝, inside 2½, properly doweled together through the brick wall. The frame of outside door made of 2x½ in one fold and covered with one-eighth inch boiler plate. Frame of inside door 1½x½, made in two folds and covered with No. 14 sheet iron and secured with swivel bar; the outside door to be panelled and molded and furnished with a $15 Yale lock; the vestibule lined at top, bottom and sides with No. 16 sheet iron.

GIRDERS AND FLOOR BEAMS.—The girders throughout will be formed of rolled wrought iron beams bolted together with 1 inch diameter bolts and nuts passing through cast iron thimble pieces of such shape as to hold the beams evenly and closely together. These blocking pieces placed at each end of girders, and intermediately, not exceeding 3 feet apart.

The girder beams under basement and first story will be 12 *inch heavy, weighing each* 180 *lbs. to yard.* Those under second and third story floors will be 12 *inch light, weighing each* 125 *lbs. to yard.* Those under the fourth and fifth story floors and roof tie will be *light* 10½ *inch, weighing each* 105 *lbs. to yard.*

All these girders are to be bolted and fastened to the columns in the strongest and most approved manner.

The floor beams throughout will be of rolled wrought iron, and placed the distances apart as shown on framing plans.

Those for basement and first story floors will be 12 *inch light, weighing* 125 *lbs. to yard.* Those for second and third story floors will be 9 *inch heavy, weighing* 90 *lbs. to yard.* And the tiers above, including the roof, will be 9 *inch light, weighing* 70 *lbs. to yard.*

Each bay of beams will have one row of seven-eighths inch diameter bolts and nuts forming tie rods.

All framing beams, headers and trimmers, will be double, bolted together and the headers and trimmers framed together and connected with 4x4 angle irons and seven-eighths inch bolts and nuts.

On each tier the beam against front and rear walls will be of channel iron corresponding in height and thickness with the respective floor beams.

Note.—Sometimes a "plate" girder is used made with center web, say 14x5-16; top plate, 10x⅝; bottom plate, say 8x¾; angle iron, 3½x3½x½, with cast iron shoes bolted on side to receive the floor beams.

GALVANIZED CORNICE.—The main cornice, *balustrade, dormer windows, angle ribs, etc.*, of roof *and pavillions*, to be of No. 24 galvanized iron with zinc ornaments. The joints in the galvanized iron riveted together as well as soldered. The cornice to be straight and true and perfectly tight and well and securely sustained and retained by strong wrought iron straps.

CRESTING.—Put up a cast iron crest railing of approved pattern, with end finials, screwed down to roofing plank with screws bedded in white lead, and the cresting strongly braced and made secure.

Some Recent Developments in the Technology of Iron.

(Continued.)

Those who deny the utility of superheated blast assert that a further increase of the hearth temperature is not necessary, nor in any way advantageous—possibly even the reverse—that the gases cannot be more thoroughly cooled or oxidized than they are in a properly proportioned furnace with moderate blast heat, and that if the blast oven be relied on for too large a proportion of the total heat requirements, equilibrium will be restored by the wasteful deoxidation of carbonic acid by coke at the furnace mouth. Thus, Bell contends that when in the escaping gases there are two volumes of carbonic acid for every five of carbonic oxide the practical limit of gas oxidation has been reached, with Cleveland stone. The cases in which carbonic acid is present in greater proportion are those in which the gases are discharged with a higher temperature than 275° C. He therefore holds that it is impossible to simultaneously have gases cooler than 275° C., and holding more than the above proportion of carbonic acid, since it is only at higher temperatures that the gases can take up more oxygen. Now, if the maximum degree of oxygen saturation and the minimum temperature can be regularly attained without the use of superheated blast in 80 foot furnaces, it is argued that it is useless to incur the expense of more powerful blast stoves. Assuming that the heat developed in the furnace is made up of three items, viz., blast heat, heat from carbon oxidation to CO, and heat from CO burnt to CO_2, Mr. Bell makes the following estimate of their relative values under differing blast temperatures:

Capacity of furnace in cubic feet	11,500	10,300	10,300	13,400
Temperature of blast degs. C	485°	598°	718°	740°
From blast heat units.	128	150	159	184
" C to CO	482	500	489	511
" CO to CO_2	390	350	352	305
	1000	1000	1000	1000

This would seem to show that the greater the proportion of blast heat the smaller is the part borne by the heat from the production of carbonic acid, or, in other words, the less completely will the gases be oxidized. In fact, it is contended, that the colder gases discharged from furnaces with highly heated blast are cool mainly through an excessive deoxidation of the gasses in the furnace throat promoted by the excessive temperature of the ascending gases. That this is not an advantageous mode of cooling is evident.

But do Mr. Bell's own experiments altogether bear out his conclusions? Let us quote two experiments with Cleveland stone. In the first an exposure of less than two hours to gases in which the CO_2 absolutely exceeded the CO, at a temperature "exceeding" 417° C., deprived the ore of 5 per cent. of its original oxygen. The second, with 50 volumes of CO_2 to 100 of CO, an exposure of six hours at 417° C. had a similar effect. It also appears that at the Wear Furnace, when charging was intermitted for an hour, the CO_2 in the gases exceeded the CO, showing the extent to which oxidation may be carried when the reduction of CO_2 does not intervene. It has further been ascertained that in the upper ten feet of an ordinary furnace a red heat is not usually reached, and that the reduction of CO_2 hardly commences below 500° C., and is only active—with ordinary hard coke—at a red heat. In support of this, we may quote the fact that only 5 per cent. of a current of CO_2 passed over coke at a good red heat was thus reduced. Here, then, we find gases containing over 50 volumes of CO_2 to 100 of CO, capable of reducing Cleveland stone to a very appreciable extent, at a temperature below that at which CO_2 reduction commences. But time and a comparatively small volume of gas and a large mass of ironstone is necessary for the development of this reductive capacity of the gases. And it is precisely these elements which a superheated blast supplies, by reducing the volume, and, consequently, the velocity of the gases.

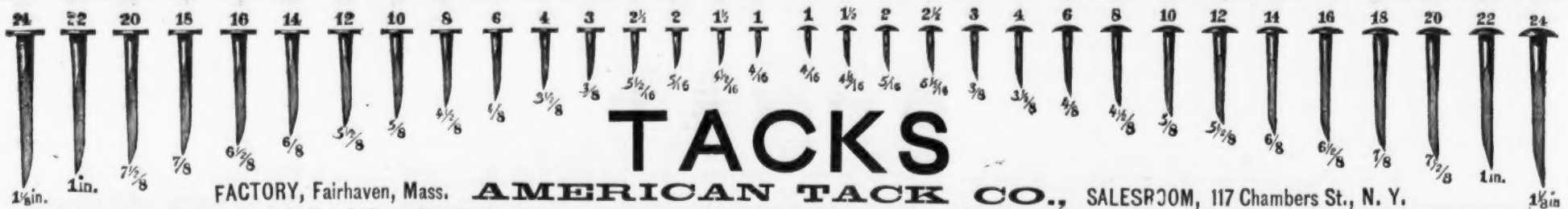
Moreover, the dissociation of CO, which the French metallurgist apprehend places a limit on the possible cooling of the gases, will not take place when the proportion of CO_2 to CO exceeds one-half. And as the superheated blast operates in enabling the gases to give up as much as possible of their sensible heat, the only obstacle to their cooling below the limit of 275° C. simultaneously with their more complete oxidation must be looked for in the somewhat dubious heat development which Mr. Bell believes attends their reducing action, and even this would be insufficient to raise the temperature of the whole mass of the charge and gases more than a few degrees. For, granting a development of forty calories for each unit of iron reduced, the heat produced by the reduction of a cwt. of iron—which would about represent the amount reduced for a ton of pig in the topmost ten feet or so of a large stack—would be insignificant when spread over many tons of gases and charge. But as the first step in reduction is probably the reduction to the protoxide, and not to the metallic state, there is little reason to imagine that this "second fire" need be taken into account at all in dealing with a section of the furnace in which a temperature exceeding 450° C. is not permanently maintained.

M. Gruner, though adopting in the main the figures of Mr. Bell, comes to very different conclusions. After analyzing the conditions obtaining in two Consett furnaces of nearly the same dimensions, and working on the same materials, but supplied with blast at the temperatures of 850° Fah. and 1324° Fah., respectively, he shows that the economy (over 4 cwt.) which attends the furnace with the higher temperature is entirely due to the effect of the superheated blast. He points out that the value of the ratio $\frac{CO_2}{CO}$ is higher, and accounts for it by the lower temperature of the reduction-zone determining a more active dissociation of carbonic oxide, while he shows that the loss by the sensible heat of the gases is far greater in the furnace with the less heated blast. Gruner finally concludes that there is great advantage (under Cleveland conditions) in raising the temperature to 1300° Fah. (700° C.) from 750° Fah., but not nearly so great an advantage in raising it another 550°, say to 1850°, if that were possible. With regard to this conclusion of M. Gruner, whose opinion is deservedly of great weight, it is to be regretted that he selected for his analysis furnaces which do not represent average Cleveland conditions, inasmuch as they are both only 55 feet high; so that much of the advantage which is claimed for the superheated blast might have been obtained by an enlargement of the furnace, and is, in fact, obtained in the larger stacks of the district. However, these conclusions as to the value of a blast of 1300° or 1400° are not entirely invalidated, even in their application to large furnaces, while they may be safely accepted as showing the value of high blast heat where it is deemed inexpedient, either from the tender and pulverulent character of the charges or other causes, to build capacious furnaces. With highly heated blast, many of the advantages of tall furnaces are obtained, while with tall furnaces a superheated blast becomes less indispensable. The case of the 71-foot Lilleshall cold-blast furnaces, which, with cold-blast, make their pig with some 13 cwt. less coke than they consumed when 18 feet lower, or a consumption hardly greater than the smaller furnace would require with a moderately hot blast, is an excellent illustration of this principle.

It cannot be too often repeated that the alleged inefficacy of superheated blast rests upon assumptions which are entirely based on the behavior of Cleveland iron stone. Thus, both for more refractory ores, as magnetite, specular ore, limenite and some of the Spanish ores, as also for the easily reducible hematites and spathic ores, there is no reason to adopt the premises on which Mr. Bell's arguments repose. The reducible hematites, and even the spathic ores, will certainly continue to give up oxygen to gases to which Cleveland stone is inert, so that there is no reason to consider the attainment of a composition of 40 vols. of CO_2 to 100 CO a practical limit in their case. As has been pointed out by Tunner, this proportion is, indeed, largely exceeded in Styria, where, however, there has been no attempt to work with a higher blast temperature than 932° Fah. Even this degree of heating is, however, followed by a saving of 25 per cent., as compared with the fuel consumption at 400° Fah. As charcoal is the fuel which seems least susceptible of economy by the use of hot blast, this is a striking result, particularly as Dufrenoy found that in France, with similar spathic ores, the economy of hot blast, as compared with cold, was insignificant. On the other side we have the experience of Mr. Smith, of Barrow, who found in a 61 foot furnace, working on hematite, that elevating the temperature from 1100° Fah. to 1500° Fah. made no difference, either in production, coke consumption or quality of iron. As this experiment appears to have been carried out most impartially, the result has much weight, though it is to be observed that even the lower temperature is one that could only be maintained by fire brick stoves.

It has also been suggested that the failure to obtain further economy with higher heats was due to the coke charges not being sufficiently diminished concurrently with the rise in the blast temperature, together with a suitable modification in the quantity of blast. For refractory ores, which, from their density and want of porosity, are probably mainly reduced by solid carbon and at high temperatures, the most favorable results should be obtained from superheated blast. Magnetite, for instance, is an ore which, it is agreed by Akerman, Siemens and others, hardly begins to be reduced under a red heat, and of which the reduction is only completed in a state of fusion. As, however, such ores are in England rarely or never smelted by themselves, evidence on the point is defective. The greater the quantity of volatile elements the charge contains, also, the greater need is there for a highly heated blast, to compensate for the absorption of heat caused by their volatilization. Akerman further observes that the more damp the air the more desirable it is to have a considerably heated blast, and so introduce as small as possible a quantity of moisture-laden air into the furnace.

All writers agree that the relative economy of the hot-blast decreases as its temperature is higher. Thus, the same economy will not result from increasing the temperature from 900° to 1000°, that follows on its being elevated from 100° to 200°, for the simple reason that in the former case a much smaller weight of air is injected than in the latter; but, on the other hand, as it does not require the same power to force in the smaller quantity, there is a proportionate saving in engine power. Akerman calculates the relative saving of coal for every 100° C. increase, assuming a saving of 10 per cent. for 100° rise in temperature, thus: for the first 100°, ·10 the original quantity; for the second 100°, ·09; for the fifth, ·066; and for the sixth, ·059 the original amount.—*Iron.*



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Failure of the Great Pumping Engines at Pittsburgh.

The Pittsburgh *Commercial*, of the 10th, says: Citizens must have noticed, last evening, that there was a scarcity of water, and we advise, until further notice, economy in its use. Yesterday from about nine o'clock in the morning both engines were out of service, and at two o'clock but eleven feet of water remained in the basin. The trouble is stated as follows: "On Wednesday morning, at an early hour, the engine Samson, the largest at the lower works, was disabled by the breaking of the wrist of the T head. Superintendent Atkinson, fortunately, had a duplicate piece, and immediately commenced the work of repairing the break. In order to keep up a limited supply, the remaining engine, "Hercules," was worked with increased velocity. About nine o'clock yesterday morning "Hercules" suddenly let down, the break being exactly similar to that which disabled the Samson with the addition of the breaking of the pitman strap.

The stoppage of the pumps allowed the water from the river and the springs known to exist beneath, to run in and fill up the pit, so that the breaks could not be reached to make repairs. Mr. Atkinson sent request to President George W. Wilson, of the Board of Fire Commissioners, and the Chief Engineers of the Department for the use of an engine to pump out the water while he could get ready stationary pumps for the purpose. The request was complied with as speedily as possible, and from three o'clock in the afternoon the "Thomas Rees" engine having been got in position between the two water works engines was at work. Mr. Brauns' evacuator was also tried, but the lift, 40 feet, was too great for it. The superintendent states that four millions of gallons per day runs into the pit so, that there was steady work of some hours before the fireman could empty it. Mr. Atkinson expects to have repairs made by this morning, it requiring about six hours to make them after the water is got out.

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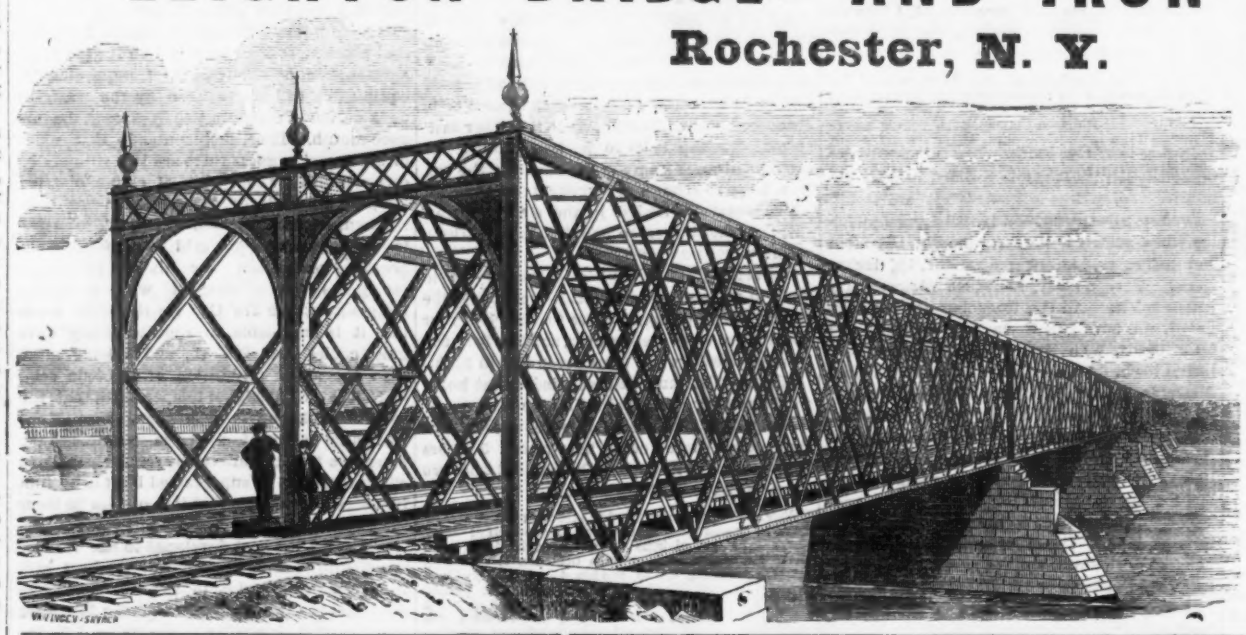

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[Accompanying engraving represents the Springfield Bridge, built by the Leighton Bridge and Iron Works.]

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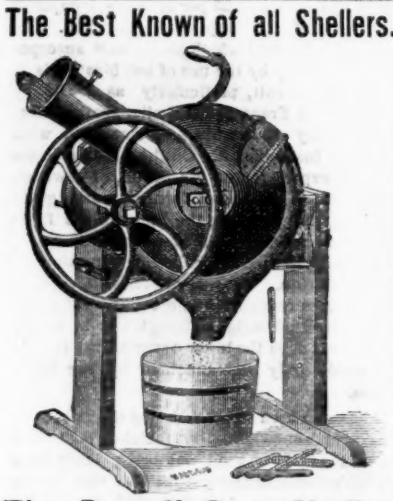

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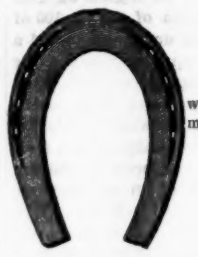

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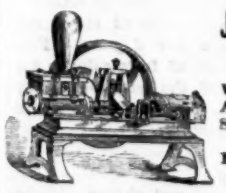

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The Bowling Iron Works.

We condense from the Leeds *Mercury* the following interesting account of these far-famed works:

The Bowling Iron Works were originated so far back as the year 1780, although the actual smelting of ores did not commence there until 1788. The works owed their origin to Mr. John Sturges, of Sandal, near Wakefield, who saw that the minerals in the vicinity of the works were of the proper character for the manufacture of first-class iron. Subsequent events have amply justified the choice of the site. In point of antiquity, however, Bowling has to yield to the works at Kirkstall Forge, which claim not only to be the first establishment that used the rolls for slitting iron into nail rods, but claim also to have carried on that process at so remote a period as 1594. Until the Bowling Works were started, however, the special iron for which Yorkshire is now celebrated was unknown. The first furnace at Bowling was blown in 1788, and is still in being, with the initials "S. S. & Co." inscribed upon its front. This furnace is strong even now in its old age, having the appearance of a fortification that has suffered a violent attack from the enemy, but has strength enough remaining to resist a further onslaught. About the time when the Bowling Ironworks were "blown in," James Watt and his able partner, Boulton, were busily employed making their steam-engines, and we read in Smiles' interesting "Lives of Boulton & Watt," of a certain litigation between the Soho firm and the Bowling Iron Company in regard to a blast engine which was at work at Bowling, and which is still in operation. Boulton & Watt claimed dues in respect of this engine, which they looked upon as closely akin to their own, and in 1796 young Watt came down to Leeds, had a meeting with the representatives of the Bowling Company, and thus reported the result of that meeting to his firm: "Enclosed you have a copy of the treaty of peace, not amity, concluded at Leeds on Saturday last between me, Minister Plenipotentiary to your Highness on one part, and the Bowling Pirates in person on the other part. I hope you will ratify the terms, as you will see they are founded entirely upon the principle of indemnity for the past and security for the future." In a paper read before the members of the British Association by Mr. Joseph Wilcock, the late engineer of the Bowling Iron Works, it was stated that the treaty of peace referred to was purchased at the price of £1640. All this tends to show that the works soon developed into a very important concern, and that advantage was taken of the latest scientific improvements in the carrying on of the business. The works were really began by three gentlemen—Mr. Sturges, Mr. Mason, and Mr. Paley—who each subscribed £5, in order to test the quality of the iron ore; and the result was such as to lead to the organizing of a powerful company. Various changes were made in the constitution of the company by death and other circumstances from time to time, and in 1869 it was converted into a limited liability company, and the present managing director is Mr. William Evans.

The extent of the Bowling Company's estate is exceeding large. Its collieries extend five or six miles in various directions. In all, the company has 42 pits, worked by over 60 steam engines, which engines are supplied with steam by 81 steam boilers, of from 10 to 50 horse-power each. There are tramways from all the pits direct into the iron works, the entrance for the whole of the tramways being on the higher ground toward Dudley Hill. The tramways cover a total distance of 21 miles, and are worked by means of wire ropes. Indeed, one of the most familiar objects up in the regions above the Bowling Works is a train of Bowling coal and ironstone wagons, and persons who stroll in the fields in this direction are frequently brought to a full stop by a notice bidding them "Beware!" With the exception of the limestone, which is procured from the neighborhood of Skipton, nearly all the mineral used in the manufacture of iron at the Bowling Works is obtained from their own mines, and, of course, none of this mineral is permitted to go elsewhere than to the foundry.

Referring to the quality of this valuable mineral, the late Mr. Wilcock said: "The substratum around Bowling is part of the most extensive and valuable coal field in England, stretching from Derby or Nottingham to this district, a distance of 60 miles, and ranging about eight miles broad." The seam of coal called the "better bed," is one of the valuable elements necessary for the production of the best quality of iron. The stone wears a dark brown appearance, and yields about 32 per cent. of iron. Both coals are caking coals, and moderately hard. This coal contains a very large percentage of pyrites in a state of intimate mixture in the coal, so that it cannot be seen. The ash fuses readily, is slightly alkaline (due to lime), and contains sulphide of iron and a very large quantity of oxide. This is the same bed of minerals that the Low Moor and Farnley Iron Companies have at command, their several mineral rights extending to points at which they meet. This is the bed that all the best Yorkshire brands are made from—brands which command far higher prices in the market than the general makes of iron. A Bowling boiler plate will fetch from £27 to £44 per ton, according to the weight, 2½ cwt. plates being the minimum, and 7 cwt. and upward being the maximum price; while good Staffordshire plates can be got for about £14 or £15 per ton. This is sufficient to show the great difference that there must be between the Yorkshire iron and the ordinary iron.

In its general features Bowling Foundry is much like other iron foundries. Here and there are to be seen improvements which are in advance of what is to be seen at other iron works, but, on the other hand, it is evident that in some things the Bowling Company have been reluctant to make changes. Within the last four or five years, however, many very extensive alterations have been effected, and improvements are at the present time in rapid progress.

There are three entrances to the foundry, the principal one being in Bowling Buck Lane. Near the entrance gateway stands a grim, residential looking building, which has been used as offices in recent years. On to the upper ground are received the minerals as they come fresh from the earth. This is the starting point of the foundry. Here the various elements necessary to the making of iron are brought together and laid in heaps. Numerous trains of coal and ironstone stand about on the rails, ready for being cast into one or other of the various fires that are burning and smoldering everywhere. There are long lines of cinder ovens and heaps, where the coal is being converted into coke. There are 14 ironstone kilns, where the iron ore is roasted. The ore is thrown into the kilns along with an admixture of black bed "breeze." It crumbles away until it reaches the bottom of the kiln, when it is carted away to the furnaces. After the ironstone has gone through the kiln, the coal through the ovens, and the limestone has been broken into manageable pieces, they are put into capacious iron wagons. There are six cold blast furnaces at Bowling, five refining furnaces, 21 puddling furnaces and 40 heating furnaces. The amount of iron made per week is about 360 tons. The largest of the blast furnaces is a recent addition to the works, and is on an improved principle. It is made of iron, and is of a circular form. The other blast furnaces are of the ancient kind. The hight of the new furnace is 55 feet from the hearth to the filling floor, it being 13 feet higher than the old ones. There is no great gaping orifice exhibited here, as in the other furnaces, all the heat and gas being utilized. The minerals are raised to the top of the furnace by means of a lift. The top is closed in with a circular, cone like iron covering, which is lifted by a hydraulic lever, and when the cavity round the edge of the cone has been filled with the due proportions of coke, iron ore and limestone, the lever is lifted, and down the whole mass descends into the furnace. The gas that is carried off from this furnace is conveyed to the boiler house adjoining, and serves to feed three boilers and a half—*i. e.*, seven fires. This furnace is certainly one of the most interesting objects to be seen at the Bowling Iron Works.

There are thirteen steam hammers at the Bowling Iron Works, some of them of a very heavy, ponderous kind. It is the custom to give a premium to the puddlers who produce the best specimens during a turn.

The new plate mill, built in 1873, is a very noticeable place. It is worked by a pair of reversing engines, on the locomotive principle, by which the necessity of heaving the plate over the top roll of the rolling machine is obviated. It is stated that in this plate mill wider plates can be rolled than at any other works in England.

In making what are known as the Bowling iron weldless tires, "stampings" only are used. First, the "bloom" is taken, and a hole about five inches in diameter is made in the center. When this has been done, the ring of iron that has thus been formed is fastened to the back of an anvil, where a flange is raised by hammering it, care being taken by constant rotation to get all the parts evenly worked. The ring then assumes something of the shape of a proper tire, and is finally perfected by being submitted to a rolling process.

The steel works were commenced in 1866. Siemens' gas process for melting crucible steel is in operation.

Boiler making has always been a great feature of the Bowling Iron Works, and a large new boiler shop has been lately erected, which is capable of turning out from two to three boilers per week. All these shops are fitted up with moveable cranes that adapt themselves to any piece of iron or any elevation.

In the making of weldless hoops for boilers there are a great number of workmen employed.

The model shop is one of the finest shops of its kind to be found. It is a large brick building, two stories in hight, and many thousands of models are kept. They are all catalogued, so that any model that is wanted can be found immediately. Amongst wheels of all sorts and sizes, giants and Lilliputians, is to be found the original model from which the first wheel for Blenkinsop's locomotive was cast. This has a label attached to it, informing visitors what a very distinguished model it is.

There are altogether between 2000 and 3000 workpeople employed in the foundry and collieries of the Bowling Iron Company. The total horse-power of the engines employed about the iron works is about 900, and in providing steam for these engines there are 38 boilers.

The Bowling Iron Works are certainly amongst the most important as well as the oldest industrial concerns in the Riding, and they have assisted in an eminent degree in the building of the commercial greatness of the country.

Aldin's Compound Engine.—At the recent fair at Pittsburgh a steam engine having some novel points was exhibited. It was called the "Aldin Triple Cylinder Compound Balance Piston Steam Engine." The principal features are two cylinders which alternately receive steam and exhaust into a low pressure cylinder common to both. In the common forms the three cylinders are placed in line and have a common piston rod. It is, however, sometimes found desirable to arrange the cylinders side by side, using three piston rods. As each of the high pressure cylinders exhausts into the low pressure cylinder, communication is opened between the opposite ends of the cylinder exhausting, and the piston returns in equilibrium, and, consequently, without back pressure. The objects sought for in this style of engine, and claimed by the inventor to have been attained, are: The utilization of all the exhaust at high or low pressure, with or without the aid of a condenser; avoidance of back pressure in the high pressure cylinders; the securing a regular rotative motion; saving half the boilers; the saving of half the fuel; the doubling of the power of the steam when compared with a simple engine. Messrs Robinson, Rea & Co., of 12 Smithfield street, Pittsburgh, Pa., are the manufacturers.

Great Fortunes.

Recent events in this country call to mind the fact that in 1872 there appeared in the London *Spectator* a list of almost every one who had died in England between 1862 and 1872, leaving a personal property over $1,250,000. It appeared by this that ten persons had died within the decade in Great Britain leaving more than a million sterling, fifty-three leaving more than a half million and a hundred and sixty-one leaving more than a quarter of a million. These estimates, be it borne in mind, referred only to *personal* property, and *in no case* included real estate. It may be added that in appraising for probate duty the estimate is very low.

The list contained only the following peers and peeresses, much of whose personalty was in pictures, plate and costly furniture: The Marquis of Landsowne, revenue principally drawn from Ireland, where he did not reside, £350,000; the Duke of Cleveland, revenue drawn from great English estates, £800,000; Duke of Newcastle, £250,000; Duke of Northumberland, vast estates and collieries, £500,000; Marchioness of Londonderry, principally collieries, £400,000; another Duke of Northumberland, £350,000; Lord Aveland, the great grandson of a wealthy merchant, landed estates, £400,000; Countess of Jersey, banker, £300,000; Marquis of Salisbury, of economical habits, real estate of great value, some of it in London, £300,000; Earl of Abergavenny, real estate, clergyman of retired and saving habits, £300,000; Earl of Normanton, son of an Irish Archbishop, much of the money originally came from the Irish church, £700,000; Lord Ashburton (Baring), £250,000; Lord Leconfield, immense real estate in England and Ireland, £250,000; Marquis of Westminster, greatest landlord in London, £800,000; Lord Foley, money chiefly derived from sale of family estates to Lord Dudley for £990,000, £250,000; Lord Derby, real estate which through rise of property around Liverpool has become worth £150,000 a year; Lord Hotham, a penurious bachelor, with great Yorkshire estates, £500,000; Marquis of Hertford, income of some £200,000 a year, from real estate, England and Ireland, always resided in Paris, a bachelor, £500,000; Earl of Lonsdale, owned great part of Cumberland and Westmoreland, a bachelor, £700,000; Duke of Bedford, immense mineral and landed estate, a hypochondriac bachelor, £600,000.

In personalty, therefore, the peerage has less than ten per cent. of the whole number of millionaires enumerated, but in the case of about half the peers enumersted, had their real estate been thrown into the scale, they would have entirely outweighed any name in the list. Of those of a million and upward, H. Gurney, of the great eastern counties Quaker banking firm, was sworn under £1,100,000; Richard Thornton, a merchant, £2,800,000; Samuel Eyres, Armley, Leeds, no doubt a manufacturer, £1,200,000; Sir Benjamin Guinness (Guinness' stout), £1,100,000. Sir Benjamin, who had restored St. Patrick's Cathedral at a cost of £120,000, also owned immense real estate in Ireland Samuel Scott, banker, a bachelor, whose family founded the fortunes of Mr. Gladstone's father, £1,000,000. Much of this fortune was the result of saving. Thomas Fielden, made in trade, £1,300,000; Baron Nathaniel de Rothschild, £1,800,000; G. Loder, trade, £3,000,000; W. H. Forman, £1,000,000; W. Crawshey, iron master, £2,000,000. Bankers, brewers and manufacturers chiefly composed the golden roll. Iron masters, too, made a handsome show, Mr. I. G. Abbott, of Newcastle, having £600,000, and Mr. Hardy, of Low Moor, £500,000: beside, Mr. Crawshey, already mentioned, one Goldsmith figures in the list for £250,000, and an electro-plater for £350,000. How well the Arkwright family have known how to keep the wealth bequeathed them by the famous founder of the family was shown by Mr. Peter Arkwright leaving £800,000, Rev. I. Arkwright, £400,000 and Rev. Godfrey Arkwright, £300,000. They had immense estates as well. The same may be said of the Peels, also sprung from the loom. One of them figures in this list for £300,000. The two greatest personal fortunes known to the English Court of Probate do not appear. They were those of Mr. Morrison, of the firm of Morrison & Dillon, dry goods merchants, and Mr. Brassey, railroad contractor. Mr. Morrison's will was sworn under £4,000,000, and he was said to have estates in fifteen counties, which, there is no doubt, were worth at the very least a million more. He entered Parliament for a short time, but otherwise never came forward in public life. Although of humble origin, he married his employer's daughter, and this was the foundation of his fortunes. He had a genuine love of art, and spent great sums upon it. Sir Charles Eastlake and other eminent academicians were his frequent and favored guests, and his very tables and chairs were modeled after their designs. His beautiful seat, Basildon, near Reading, Berks, was full to everflowing with exquisite works, but there was an utter absence of all vulgar ostentation. Mr. Brassey carried this retiring and unostentatious disposition even further. One very moderate sized mansion in Lowndes square sufficed for him—while Mr. Morrison had three residences—and an old friend of his used to declare that he never saw him thoroughly wretched but once, when Mrs. Brassey had set her heart upon a rather conspicuous mansion near Cambridge House (then occupied by Lord Palmerston) in Piccadilly. But presently she, the best and most amiable of wives, as he was of husbands, gave way, and Mr. Brassey's brow was smooth again. He seemed to care nothing for money for himself; all his thought was for his sons. Mr. Brassey divided his property equally between his three sons. Mr. Morrison left more to his eldest son than to the rest. In his will he says: "I leave to my eldest son a legacy of one million sterling." This was up to that time the only legacy of that amount on record in England. In addition he bequeathed to him vast estates. His second son, Alfred, whose house on Carlton House Terrace is one of the sights of London, received about £40,000 a year; the younger has between £12,000 and £20,000 a year; the daughters, £50,000; his widow, £10,000 a year and two superb residences. But for his benefactions while living, George Peabody must have been included in the list of those who died worth over a million sterling. His will was sworn in London under £400,000, and the total of his gifts amounted to over $7,000,000.

Furniture in the Olden Time.

The great insecurity of life during the feudal time, the bad roads, the frequent warfare, and the lack of skilled artisans contributed to render furniture very scarce and very dear. The village wright, he who made a cart wheel or affixed the palings of a pig sty, could construct the rude three-legged stool that gave accommodation to the farm-house visitor, or the settle on which the dwellers in the baronial mansion took their seats before the fire. But the carved chair of the knight or the lady, the canopy of dais that overshadowed the heads of master and mistress in hall, the oaken press where was kept the hoarded finery, the reredos, the latticed screen for the tiny household chapel—these were the work of some roving joiner, one of those free lances of trade who wandered the country, living at free quarters, and picking up a handful of French crowns in one place, a few doits or stivers in another.

Even a king had very little in his own chamber beside his bed and the chest that contained his robes and hunting attire, his royal hose and velvet cap, his mail shirt and Florence shoes of milk-white leather. The bed was always draped with something rich or gaudy, cloth of gold or silver, or some silken fabric bought at huge price from Venetian merchants. On state occasions the king's mantle, trimmed with choice furs and broad laces, was flung upon this bed; and cabinet councils were held under the presidence of the king's grace in the king's own lodging.

The great hall of a castle or fortified mansion, so late as the commencement of the sixteenth century, was thought sufficiently furnished if it held a dozen stools, a couple of stiff-backed chairs, a few benches, and a permanent side table known as the "black-stock," on which stood loaves and leather jacks of thin ale, with single-milk cheese, and, in some cases, cold bacon or mutton hams, so that hungry retainers, coming in from a long ride, might break their fast without giving trouble to cook or scullion. The long dinner table itself, a mere range of boards supported by props, was broken up after every meal; while the floor, strewed with straw in winter and with rushes in summer, could be promptly swept clear in reply to the cry of "A hall!" for dancing purposes.

The Elizabethan epoch could boast of much more furniture than had sufficed for an earlier period; but the tall, straight-backed chairs, the rigid seats, the massive tables, and the heavy black presses and escritoires, all possessed a severe angularity which few would welcome as a revival of by-gone mode. It should be remembered that the English standard of comfort was, thee centuries or more ago, very far in arrears of that which prevailed in Holland, France, or Northern Italy. Erasmus saw much to praise while in England, but he was unsparing in his criticism of the slovenly untidiness of the English homes on which he set his learned eyes. Only a hundred years ago Cowper thought it worth while to devote an eloquent poem to the introduction of that strange Oriental luxury, the sofa, although the "day bed," or straight couch, was perfectly well known in the times of Johnson and of Shakspeare. In a yeoman's dwelling fixed seats frequently formed a semicircle around the cavernous fire-place, while stools, or casks set on end, accommodated the junior members of the family.

We have been so accustomed to take our ideas of French furniture, at its best, from the buhl and ormolu of the First Empire, or from the rococo prettiness of the Louis the Fifteenth epoch, that few but professed scholars of history are aware to what a pitch the ostentatious opulence of the French nobility had soared during the stormy period that intervened between the marriage of Francis the First and the accession of Louis the Fifteenth. Yet proof enough exists that complete sets of furniture in solid silver were by no means uncommon among the provincial seigneurs of France, and that the existence of these masses of bullion not unfrequently exercised a considerable effect upon the smouldering warfare of the League. A devoted adherent of the King could, by melting down his tables and chairs, at any time equip a squadron, while the prospect of a spoil so rich attracted mercenary troops from every land.

Tapestry, so highly prized by our forefathers, must always have been peculiarly an adjunct of high station; while the stamped and gilded leather which in some instances replaced it was not invented in Spain until toward the date of the discovery of America. But silken hangings, or others of fine cloth and of considerable value, were frequently heir-looms in families of no very lofty genealogical pretension, although it was only on holiday occasions that the walls of rooms were thus gayly decked. The introduction of carpets, originally from Broussa, in Turkey, belongs to a very recent date; while Kidderminster's once famous looms were set up in rivalry with those of Tournay and Brussels, where were produced the earliest imitation of Turkish and Persian floor-coverings.

Modern upholstery, beside adopting curves and rounded edges and elastic cushions undreamed of in the earlier Georgian reigns, has very much enlarged the stock of its materials. Oak was almost the only wood available to the carver or the cabinet-maker of the Plantagenet days.

A Railroad Incident.

The Davenport (Iowa) *Democrat* has the following account of the very queerest of railway accidents: It happened on the Chicago, Rock Island and Pacific at the Homestead Summit. The company has been grading a good deal at the Summit this year, cutting down the track on one side about fifteen feet at the deepest part. At this time the day trains keep the old or high track, so that the dirt train may not be interfered with in the cut. During the night the dirt train is set upon the high track, and the night trains over the road are run through the cut. The other evening come in John McChesney's train from the West—five coaches and two baggage cars. Of course they would run through the cut, which was approached at a twenty-five mile rate. Crawford was drawing the train. The switch was set right, and the locomotive rushed into the cut. In an instant the engineer heard the alarm bell ring, and whistled down brakes. Looking back to see what was up, he could see no train. The next thought was that the brakes might not respond promptly—it was down grade, and the coaches might come down upon him with a crash. He opened out and darted ahead to keep out of the way. As he did so he was amazed to see the coaches on the upper track, some fifteen feet above him, charging on the dirt train standing on the track a little way ahead. John McChesney was wide awake at the "down brake" whistle. The brakemen rushed to their places and turned down with all their might. The train was heavy and glided on with immense force, John knew. The train on this road being handled with air brakes, the old brakes are not always so effectively worked as when in constant use. But the boys handled them well, but couldn't stop in time to keep off the dirt train. It was feared that the collision might squabble the train, and perhaps pitch the whole concern into the deep cut below. But it was more fortunate. The forward baggage car struck the rear dirt car, and being set higher up passed along upon it, crunching up things until the trucks met. Then the train stopped. On looking out, about the first thing that John saw was that the locomotive was in the deep cut. Gone to smash? That was the first thought. Looking over to see the wreck, he found it was a tolerably lively one. Calling to his engineer, he wanted to know what was the matter. The engineer didn't know—his end of the train was all right anyhow; what was John doing with his coaches climbing about up there? Then they went back to the switch. It was set to the upper track. How had the locomotive and tender got upon the lower one? John said it beat him. Engineer looked beat too. Then they looked at the thing closer, and found that the target-pin was broken. That showed why the train had parted. The switch had been set for the cut; the locomotive and tender passed over, but before the forward wheels of the baggage car had reached the switch—even in the space of the shortest instant—in the twinkling of an eye, the switch had shifted, and the baggage cars and coaches glided along upon the upper track. Not a wheel had left the track, not a jar had been felt. It was the most miraculous railroad incident in all railroad history. Nor was the collision on the upper track more than that of a spent train. Scarcely a jar was felt by the passengers. The sleepers slept on undisturbed. The bending of the king-bolt was the principal damage. The train was reconnected, run back to Homestead station, the damaged car switched out, and the train came in yesterday morning only an hour behind time.

Petroleum Water Gas.—The method of Mr. T. S. C. Lowe consists in producing from anthracite and the decomposition of steam a gas of very high heating power, and then, when the product is to be used for illuminating purposes, enriching it by means of crude petroleum. The process is as follows: The anthracite is charged in a small cupola of say 3½ feet diameter, the bed of coal being kept from 3 to 4 feet deep. When fairly ignited the base is closed, and superheated steam is admitted through tuyeres a short distance above the grate bars; the steam, in its passage through the burning coals, is decomposed, producing a mixture of hydrogen and carbonic oxide. In this condition the product is well adapted for metallurgical and domestic uses, as a heating gas. It is destitute of illuminating qualities, but the cost of its production is very small. When the gas is to be employed as an illuminant, a small jet of crude petroleum is directed on to the surface of the coal. The water gas and petroleum vapors are thus mingled at the instant of formation; and, in order that the resulting product shall possess the permanent qualities of coal gas, it is passed through a chamber of fire brick, heated to a high temperature. The charge employed in the works using this process is, on an average, about 280 gallons of crude petroleum and 3600 lbs. of anthracite for the production of 70,000 cubic feet of illuminating gas; the cost per 1000 feet being estimated at from 56 to 60 cents. The first gas works of this description were erected at Phœnixville, Pennsylvania, and they have been in operation for about eighteen months.

BUSINESS ITEMS.

MAINE.

An exchange of the 4th says: The hearth of the Katahdin Iron Works has been repaired, and the furnace will start next week with a stock of 150,000 bushels of coal and 3000 tons of roasted ore. Contracts will be made for cutting and hauling 10,000 cords of wood for the company, at prices from 10 to 15 per cent. lower than last year.

The long vacant shovel factory at Portland is to be converted into a manufactory of woolen hats, by a company having ample capital, who will give employment to one hundred men.

MASSACHUSETTS.

It is reported that Lucius W. Pond, of Worcester, was arrested at San Francisco on the 9th inst., on a requisition from the Governor of Massachusetts, on a charge of forgery.

D. M. Dillon, of Fitchburg, is filling orders for a 80 horse steam boiler for the Ludlow (Vt.) Woolen Mills; one of 50 horse-power for the Fitchburgh Jail; two 60 horse-power steel boilers and rotary boilers for the Montague Paper Company, Turner's Falls; one of 50 horse-power for Julius Cutter, Jaffrey, N. H.; and one of 50 horse-power for J. N. Farnum, Keene, N. H. Beside boilers a large variety of kindred products are turned out, such as rotary bleechers, bleaching keirs, oil and water tanks, safety valves, &c.

The Rodney Hunt Machine Company, Orange, have been organized since Jan., 1873, as a stock company, but was previously run under the title of Hunt, Waite & Flint for many years. They are now building machinery for the Portland Hat Company, and finishing up several large contracts for water-wheels. The company have just finished the work commenced some time ago for the Pepperell Mills and Laconia Mills, consisting of seven water wheels. The company have facilities for turning out water wheels and every description of mill work. They have just put in two 48 inch wheels for the Lewiston Mills, Lewiston, Me.

At the Lowell Machine Shop the dullness of work has rendered it expedient to reduce the hours of labor, temporarily, in the departments in which business is slack, and four-fifths of the entire shop is now running eight hours instead of ten. The foundry is an exception to this rule. The only change in working hours is in the afternoon, work being stopped at quarter before four o'clock instead of at six, Saturdays included.

Those in charge of the armories at Springfield are afraid that they will be forced to observe the advent of the new year by either reducing the force or shutting down entirely for a period. They are accordingly advising the men to find work elsewhere, if they can, before January 1, to avoid coming to this necessity.

The John Russell Cutlery Company, Turner's Falls, employ 450 men and boys, and some 30 girls, and manufacture a thousand different styles of knives, and all the kinds of forks which accompany them.

The Taunton Iron Works Company are running for the present on three-quarter time.

PENNSYLVANIA.

It is reported that the plate mill of Reis, Brown & Berger, at New Castle, started up on the 6th, and that the nail factory at the same place began operations a short time previously.

On the evening of the 8th, the Catasauqua Manufacturing Company gave orders to relight the fires in the rolling mill at this place, and at this time of writing all seems activity and life around the works. The men employed are largely new hands, many of the old employes being refused work. The company have determined that hereafter they will govern their works, and if men are not satisfied with wages, money due for work will be paid, and the dissatisfied can seek employment elsewhere. At present the works are being operated with day turn, as orders are scarce.—*Catasauqua Dispatch, Dec.* 11.

The gas well at the Rochester tumbler works "struck" a short time ago, became partly filled up by some means, and was bored deeper in consequence, and on the 26th ult. gas was reached at a depth, we understand, of 950 feet, which sent the sand pump to the top of the derrick. It is said the company will put down another well soon.

The weight-plate at the North Cornwall Furnace, near Lebanon, was blown out on the 9th, and the cinders thrown over the casting house, setting fire to the roof, which was destroyed. Mr. Hershey, one of the keepers, was seriously burned.

OHIO.

The Cleveland *Trade Review* of the 8th says that the Lake Erie Iron Company's mill, Cleveland, is running on small orders for merchant iron, but the mill will probably be closed in January unless business improves.

Six new locomotives are to be built in the Cleveland shops of the C. C. C. & I. Railroad Company, some of which are now in process of construction.

The work of altering the heat blast of the Cleveland Iron Company's furnace for the burning of gas which has been in progress for some time is now completed; the change has been a profitable one, as the average daily production of the furnace has been increased from about 28 tons to 34 tons of metal.

The piling for the Cleveland breakwater has been carried out about 1000 feet.

A furnace hearth has just been shipped from Sclotoville to Oregon, at a cost of $600.

On Monday, the 29th ult., C. Aultman & Co., of Akron, shipped three car loads of separators, horse-powers and Buckeye mowers direct to Valparaiso, Chili.

The Pomeroy *Telegraph* says: On this side of the river the following salt furnaces are now running and manufacturing their usual quantity of that product, which is being disposed of at a living price: Danbury, Sugar Run, Excelsior, Buckeye, Coalridge, Windsor, Sutton and Syracuse.

Some weeks ago we noticed the fact that the Lawrence Furnace Company had received a large quantity of coke from Pittsburgh with the design of running the furnace for a while instead of charcoal, if it was found possible. The experiment was tried with coke, using a small portion of native coal. It worked admirably, and the coal was increased until it was found that a splendid article of foundry iron could be manufactured with 75 per cent. native coal. The furnace has been run on this per cent. for two weeks or more, and proves more than satisfactory. On last Saturday a change was made to coke, for the purpose of filling a small order of charcoal iron which the company had received as they were about to try their experiment. As soon as this ord r is filled a new hearth will be put in; the bosh slightly changed, and the furnace worked on native coal. The coal used is supposed to be the Waterloo vein, and is from three to four feet thick. The complete success of this easy change of charcoal to a stone coal furnace, and the use of our native coal for smelting purposes, has created quite an excitement among iron men.—*Ironton Journal.*

Valley furnace No. 2, in Sharon, was blown in on the 24. On the third day she made 36 tons of good Bessemer iron.

Messrs. Seidel & Hastings have just completed and put in operation an additional rolling mill at their works. In this mill their stock is prepared into the necessary sizes and shapes directly as it comes from the forge, thereby effecting a considerable saving of labor and fuel, and enabling them to run their other two mills exclusively on finished plate iron. The capacity of the works is now 4500 tons of finished iron per annum, running in day time only. These works have been running steadily to their full capacity since February.—*Wilmington, Del., Commercial.*

The Ironton *Commercial* says: The Iron and Steel Company has circumscribed its tall smoke stack with seven strong iron bands. The intense heat blown against it from the top of the blast furnace caused it to crack in several places to such an extent that it was deemed expedient to band it as a precautionary measure.

MICHIGAN.

The Ontonagon *Miner* says that all the new machinery for the addition to the Ontonagon stamp mill, and the amalgamating pans, have been sent forward to Iron River, and they will be got to the mine and in place as soon as possible.

OREGON.

The Ironton *Register*, of a recent date, says: We extract from a private letter from our friend E. W. Crichton, formerly of Buckhorn Farnace, but now of Oswego, Oregon, as follows: We blowed out Oct. 15; in six days tore down the chimney, hot-blast, inwall and took out the hearth. The fire brick had all melted in the bottom, and was iron and brick melted together, the like you never saw. We have two car loads of the hearth from Gould; there is another car load yet to come; think we will be ready to start in two weeks. We have now on the bank 7000 tons ore, 400,000 bushel charcoal; have some coal out yet, but have stopped the colliers sending it, refusing to take it this wet weather; we will have to draw it out and crib it. The rain set in about 15 days sooner than usual this year; we have sheds to put the ore in, and have to cover the balance. Next year, if we get in stock (which is not yet decided—they want to see how the furnace will work first) we shall not pay over 6 cts. per bushel for coal delivered.

MISSOURI.

In its issue of Dec. 2, *Mines, Metals and Arts* says: The first car wheel was cast at the car works in East St. Louis on last Wednesday morning; a large number are now turned out daily. The company has a contract for 200 cars, which are to be manufactured as expeditiously as possible. About 150 men are now employed, and it will not be long ere 200 will be necessary to do the work.

CALIFORNIA.

The Risdon Iron Works, San Francisco, are building a set of engines for a new steamer designed for the Humboldt route.

The Ophir Hoisting Works, Virginia City, which were destroyed, have been replaced by other machinery. The Risdon Iron Works, San Francisco, had just completed machinery for the new combination shaft of the Chollar, Hale & Norcross and Savage. It was all ready to ship when the fire occurred. These companies turned this machinery over to the Ophir Company, and it was immediately shipped, and is now being put up. The Risdon Works then received an order to duplicate the machinery for the original owners, and it is now well under way, considerable progress having been made already. The same works are also repairing the lighter portions of the machinery destroyed at the Ophir.

Effect of Electric force on Boiler Plates.

Mr. Coleman Sellers, in a communication to the *Journal of the Franklin Institute*, says:

The notion that the destruction of iron boilers by corrosion when supplied with ordinary water is ascribable to galvanic action, has, in my opinion, very little foundation in fact. Some samples of iron corrode more readily than other samples, but they will do so when submitted to any of the conditions favorable to such slow combustion. In my experience as a locomotive engine builder and more recent observations, I have never seen any good reason to abandon the common practice of uniting metals of known different electro conditions in one structure, and will cite what you must have overlooked as you do not mention it in your note, viz.: the use of cast iron boiler heads, cast iron man-hole rings in connection with wrought iron shells. Also, in locomotive practice of wrought iron boilers with copper tubes, and even copper fire boxes—some such boilers being of undoubted long life. So with many instances of boilers with brass tubes and all the fittings such as hand hole plugs are made of brass. I imagine that any of these metals so placed in connection with one another as to form a galvanic battery of usual construction, and then immersed in a bath of such water as is usually used in boilers, that the electric or galvanic currrents obtainable from such, a construction would be a very feeble and that no "strong galvanic action" would take place. I like to see all theories substantiated by facts, but the facts should be viewed equally not unequally. Electricity is dragged in too often to account for phenomena that could be explained in other ways. You are quite right in saying that "it is a serious mistake to admit as a popular utterance, that we must look to 'galvanic (voltaic?) force' as the cause of deteriorations of boilers, or of iron structures of any kind." I do not wish to say that it has nothing to do with it under certain conditions, but that it plays any such important part as to make us avoid combinations of metal of great mechanical advantage when combined, for fear that some grand galvanic action will destroy the structure so built up, when we all know well enough that such combination of dissimilar metals have stood the test of years, and will continue to be used with safety in good engineering practice.

Special Notices.

Wanted,

To purchase a well established Hardware business, or would take an interest as partner in such a concern, in which case the best of references would be given and required. Please address with full particulars in detail. **"JAMES,"**
Box 3491 P. O., New York.

A Gentleman having eight years' experience of traveling in the West, and an extensive acquaintance among the leading iron and heavy hardware houses, desires to represent some manufacturer on salary or commission. Address, **J. L.,**
Office of *The Iron Age*, 10 Warren St., N. Y.

WANTED a position in a Wholesale Hardware House, by a young man, as clerk or salesman. Six years with present employers.
Address, **"HARDWARE,"**
Office of *The Iron Age*, 10 Warren St., N. Y.

WANTED by a young man thoroughly acquainted with the *General* Hardware business in all its branches, also *Builders'* Hardware with all its details, a situation as buyer, salesman or stock clerk. Has had 15 years' experience, and can give A 1 references as to ability, character, etc. Ideas as to salary moderate, and has no objection to leave New York for any other city.
Address, *"ENERGY,"*
Office of The Iron Age, No. 10 Warren St., N. Y.

SITUATION WANTED.—A young man, with 22 years' business experience, gained in responsible positions, desires a situation. He is a good manager, an experienced salesman and an excellent correspondent, with best credentials as to responsibility, capacity, industry and experience. Will locate at any point offering him a business opportunity. Address,
Care editor of *The Iron Age*. *R. L. S.*

THE ADVERTISER wishes to engage as partner in some safe and profitable manufacturing business well established in New York, New Jersey or Connecticut, to which he would give his whole time and several thousand dollars in cash capital, or would buy out such a concern if capital required is not too large. Best of references given and required. Address,
"J. H. F," Box 3491, P. O., N. Y.

To Let,

A very desirable office at 42 Cliff Street, New York. Possession immediately.

To Manufacturers of
IRON OR COTTON, MECHANICAL ENGINEERS, LOCOMOTIVE BUILDERS, &c., &c.

A young American gentleman of 20, who has had a liberal education, and can furnish first-class references, seeks a situation. He speaks French and German. Salary of less importance than employment in a manufacturing concern where he could make himself thoroughly useful. Address, **O. P.,**
P. O. Box 1931, Boston, Mass.

Wanted.

A rolling mill superintendent is open to an engagement as superintendent or mill manager. Is now engaged in one of the largest rolling mills in the United States. Has had over twenty years' experience in Europe and America in the manufacture of railroad and merchant bar iron. The best of references can be given from past and present employers. Address, *MILL MANAGER,*
Office of The Iron Age, 10 Warren St., N. Y.

Wanted.—A Partner,

With $1500, to join the advertiser on the 1st of January, 1876, in a first-class

Commission Hardware Business.

To a gentleman thoroughly posted in the Hardware and Stove Trade, and accustomed to travel for orders, this presents an unusually favorable opportunity for acquiring a large permanent income upon a very small outlay of capital. Unexceptionable references given and required.
For particulars, address,
"COMMISSION HARDWARE,"
Office of *The Iron Age*, 10 Warren St., N. Y.

OPEN FOR ENGAGEMENT, an experienced Mechanical Engineer, as Superintendent or Designer and Draftsman on high, low and compound pressure Engines, for Steamship, Corporation Pumping, &c. Thoroughly posted on specification, estimate work, &c., and of large general experience. *M. ENGINEER,*
Office of *The Iron Age*, 10 Warren St., N. Y.

DISCOUNT LISTS.

Hinges { Stanley Works' 1st...10 % to 50 % each, 75c.
and Butts, { Union Mfg Co.'s.....10 % to 60 % " 75c.
Bolt, File and Hinge and Butt List.—Contains all the lists and discounts that are used.....Price $1 00
Dayton & Lamberson, 97 Chambers St., N. Y.

WANTED.—A first-class business man familiar with machinery and manufacturing, capable of handling large bodies of men, desires a responsible position. References satisfactory. Address,
IRON AND STEEL,
Care of *P. O. Box 813, Bridgeport, Conn.*

Special Notices.

SPECIAL NOTICE.

I have three patents for Dies, Machinery, and Tools for making Augers and Bits, each running seventeen years; dated as follows: Dec. 19, 1865; January 31, 1866, and July 3, 1866. **There is a special claim on each of the Dies.** All persons infringing on said patents will be held responsible to the extent of the law. **Russell Jennings.**
DEEP RIVER, Conn., Sept. 7, 1874.

WANTED TO PURCHASE,
100 tons good Second-Hand T Rails, 18 or 20 lbs. per yard.
Address, giving particulars,
PIPER & THOMPSON,
Lapeer, Mich.

TO LET,
A Light, Handsome Office.
Possession Immediately.
HERMANN BOKER & CO.,
101 Duane Street, N. Y.

MANUFACTURERS

desirous of introducing their goods to the **British** and **Continental** Markets, are advised to insert advertisements in the newspaper **"IRON,"** published every Saturday, at ***99 Cannon Street, London, E. C.***

SCALE: First 3 lines, 3/; every additional line, 10d. Price, 6d. per Copy, or 30/ per annum, inclusive of postage to the United States.

Steel Castings.

Solid and Homogeneous. Guaranteed tensile strength, 25 tons to square inch. An invaluable substitute for expensive forgings, or for Cast Iron requiring great strength. Send for circular and price list to
CHESTER STEEL CASTINGS CO.,
Evelina St., Philadelphia, Pa.

SITUATION WANTED.—By a man of ten years' experience in the Mercantile Iron business. Is thoroughly acquainted with Bar, Sheet and Plate Iron business, and has an extensive acquaintance throughout the West, having for seven years successfully filled the position of traveling salesman. Will be open to an engagement from Jan. 1. Address, *T. S., 60,000 lbs.,*
Office of *The Iron Age*, 10 Warren St., N. Y.

New Hardware Store.

Manufacturers and Jobbers please send price lists with discounts to
GEO. E. WEAVER,
1083 High Street, Providence,
(Olneyville), R. I.

Briesen's Patent Agency
FOR SECURING INVENTIONS, TRADE MARKS, &c., IN AMERICA AND EUROPE,
No. 258 Broadway, New York.
A. V. BRIESEN.

Important to Manufacturers.
BISSELL, WELLES & MILLET,
Auctioneers and Commission Merchants, No. 15 Murray St., New York.
Solicit from Manufacturers and others consignments of Hardware and Cutlery for our weekly Auction Sales to the Trade, or at private sale for cash, as desired. Our facilities for moving large lines of goods are unsurpassed. Advances made if desired.

Business Opportunities.

New Capital Procured, Partnerships Arranged, and Commercial, Mining and Banking Corporations Organized, by
CLARKE, CHITTY & CLARKE,
Board of Trade Offices, New York.
P. O. BOX, 4071.

Merchant Iron or Nails

Wanted in exchange for 300 tons No. 1 Wrought Scrap Iron.
GILCHRIST & GRIFFITH,
Mount Pleasant, Iowa.

A. PURVES & SON,
Corner South & Penn Streets, Phila.,
Dealers in
Scrap Iron & Metals, Machinery, Tools, Shafting & Pulleys, Steam Engines, Pumps & Boilers, Copper, Brass, Tin, Babbit Metals, Foundry Facings. Best Quality Ingot Brass.
Cash paid for all kinds of **Metals** and **Tools.**

DROP FORGINGS.

The TRENTON VISE & TOOL WORKS, Trenton, N. J., having increased their facilities, are now able to do all kinds of
Iron and Steel Drop Forgings
in quantities to order at reasonable rates.
HERMANN BOKER & CO., Proprietors, 101 & 103 Duane St., N. Y.

Wanted—A Partner,

In a foundry and machine business, already well established. Locality splendid and healthy.
A practical man with means is wanted to join a practical man who is already well established.
Address *CAR WHEEL FOUNDRY,*
P. O. Box 134, Selma, Alabama.

For Sale, &c.

FOR SALE.

An ¼ inch mill train for making Merchant, Band and Hoop Iron. Will be sold cheap.
Apply to **W. W. JONES,**
Near the Lehigh Valley Railroad Depot,
Allentown, Pa.

For Sale.

AT FURNACE SITE,

☞ **On the 20th Jan. 1876, at 12 o'clock, Noon.**

FOR SALE at Public Auction
The Napanock Blast Furnace Property.

Description of the furnace is about as follows: Hight of stack 48 feet high, and 12 feet bosh, built of stone to top of bosh, thence up of brick banded with heavy iron; lining is of fire brick 20 inches thick. Hearth and bosh are of fire brick. Tunnel head is 6 feet diameter. Hot blast was erected by Mr. McHose, of Reading, Pa.; is first-class, almost new. The power is of water, said to be of double the capacity; one of the best water powers in the State. Wheel is overshot, 26 feet diameter 6½ feet face. Capacity of furnace 20 tons Anthracite iron or 15 tons of charcoal iron. Woodland is abundant, from $3 to $6 per acre, for many years. Ores by railroad or by Delaware and Hudson Canal, which passes Napanock, which is a thriving place, two miles from Ellenville, Ulster Co., New York.

Cost of making iron at this furnace is about as follows: For Anthracite iron per ton.

	Ton.	Cwt.	Qr.	Lb.	
Coal	1	15	0	0	
Jersey Ores...⅜ ton, 37½ P ct., at $4 P ton					$3·00
Cornwall Ores..⅜ " 30 " at 4—3·60					2·78
Fishkill Ores...⅛ " 20 " at 4					2·00
Napanock Ores..¼ " 15 " at 3					1·00
Limestone				75c ton	....
Labor and incidental expenses					8·50
					$19·69
Charcoal Iron—say, 130 bushels at 8c. bushel					$11·40
Iron Ores, the same as above					8·63
Limestone ⅛ ton (only ⅜ amount required by Anthracite Coal)					·38
Labor and incidental expenses being less than by Anthracite Coal					3·00
Making the cost of Charcoal Iron					$23·41

For further particulars, apply at furnace or of
H. RANGE,
94 Gold Street, New York City.

FOR SALE.

TESTING MACHINE, built by the South Boston Iron Co., arranged for tensile and compressive strains, capacity 150 tons.
MILLING MACHINE, built by Brainard Milling Machine Co., cutters swing 28 inches diameter, and spindle set at right angles, which insures accurate work.
IRON ROOF, that covered New England Iron Co.'s Mill, 8 arches 80 feet span, posts 18 feet high, building now 80 feet wide by 90 feet long.
ROLLING TABLE, for straightening Iron.
PUDDLE TRAIN, for Billets and 3, 4 and 6 inch Bars.
FIVE DRILLS.
CORRUGATING MACHINE, Complete.
CORRUGATED SHEET IRON and barbed Nails.
SMALL UPRIGHT ENGINE, 15 H. P., 8 inch cylinder.
PUMPS, Etc.
Apply to **WM. E. COFFIN & CO.,**
8 Oliver Street, Boston.

THE COPARTNERSHIP of J. P. Verree & Co. being about to expire by limitation, that firm, now engaged in the manufacture of Edge Tools, Hammers, &c., at Verree's Mills, Philadelphia, desiring to discontinue business, offer For Sale the good-will, stock and fixtures of said concern at a reasonable figure. The property can be leased for a term of years at a much reduced rate.
Address, *J. P. VERREE & CO.,*
Verree's Mills, P. O. Philadelphia, Pa.
JOHN P. VERREE. W. G. JUSTICE.

ROLLING MILL MACHINERY.

Will be sold at Auction on Tuesday, Dec. 21, if not previously disposed of at private sale, Two Trains Rolls, extra Rolls, Lathe, Shears, &c., for making all the usual shapes of small sizes of Iron. Price, $1300.
HOWELL, ILER, PROBERT & CO.,
Troy, N. Y.

HARDWARE BUSINESS
For Sale.

In the city of Norwich, Conn., an old stand facing two streets. Rents low. Good help and doing a prosperous business. Large back country. The best of reasons given for selling. Address,
FULLER & PARISH, Norwich, Conn.

For Sale,
Stove and Tin Business.

Will sell, on good terms, one of the best arranged House Furnishing Stores in Canada West, at St. Thomas. The premises are roomy, the buildings having been arranged especially for this trade, with Tinsmith's workshops and benches complete for 12 men.

Present Stock about $6000.

St. Thomas is the head quarters of the Canadian Southern Railway Co. To a practical, energetic man this offers unusual advantages. Business well established and with good connection. Reason for disposal, present proprietors increasing their wholesale and retail Hardware Store next door to the above premises. Address
HORSMAN & HORSMAN,
Iron and Hardware Merchants,
St. Thomas, Canada West.

FOR SALE.
At Lowest Manufacturers' Rates,
GUNS & SHEET ZINC,
Best German and Belgian Brands,
By ***LOUIS WINDMULLER & ROELKER,***
90 Reade Street, N. Y.

Valuable Furnace Site
FOR SALE OR ON ROYALTY,

Possessing ingredients to make Car Wheel Charcoal Pig at $14·75 per ton. Any head of water power, Forest, Iron Ore 70 per cent., Limestone, Clay, Refractory Stone for construction abound together, same property; makes best neutral flange iron.
H. C. WYETH, Baltimore, Md.

For Sale.

A first-class Hardware Business, located in the thriving city of Bloomington, Ills. Above business has been established for over twenty (20) years, and presents to any one desirous of doing an "A No. 1" retail and jobbing trade a most favorable opportunity. Amount of stock about $15,000. Will be sold at a sacrifice. Ample reasons given for selling. For further information, address,
GEO. BRADNER, Bloomington, Ills.

FOR SALE,

at 10c. a copy, Weekly Spanish Review and Prices Current. The undersigned is also a ***Translator*** from and into the English, Spanish, French and German. ***Latest Translations made:*** for the governments of Germany and Spain, Pacific Mail S. S. Co., Walter A. Wood; Morris, Wheeler & Co.; Todd & Rafferty; John T. Dunkin; Fisk & Hatch; R. W. Wilde; Wilson Sewing Machine Co.; J. Hess & Co.; H. Marquardt; M. Echeverria & Co., and Chas. E. Little, New York; Hocking Valley Mfg. Co.; W. F. Potts, Son & Co., Phila.; Atlantic and Pacific Land Co.; B. E. Flemming, Jersey City; Wilder & Co., Savannah, and the Tanite Co.; Stroudsburg ("Emery Grinder"), to whom he refers.
C. KIRCHHOFF,
Metal Reporter of "The Iron Age,"
Box 3091, New York P. O.

Trade Report.

Office of THE IRON AGE,
WEDNESDAY EVENING, Dec. 15, 1875.

The past week has been without important event in Wall street. General trade continues without promise of immediate improvement, and with the end of the year it is feared a great many changes and suspensions will be announced. The money market is somewhat stiffer. The rate on call loans has advanced to 5 @ 7 per cent., and the discount rate on prime business paper is 6 @ 8 per cent. The impression prevails that the rate will be lower early next year than now; consequently there is a demand for long date paper. It may also be safely assumed that the mercantile demand for money will be greater next year than this. Dull as matters now are, there is reason to hope that the crisis of extreme depression has passed, at least so far as general trade is concerned.

The iron trade cannot be expected to share to any great extent in the first improvement, as a large consumption of that metal seems to depend, primarily, upon general prosperity. Everything is favorable, however, for an improvement with the return of the spring season. The South and West are in better condition than they have been for many years. Ever since the panic the merchants of these sections have devoted their energies to liquidation; they have bought carefully with a view to quick returns, and are now carrying very small stocks. The Centennial will have the effect of loosening the purse strings of the nation, and putting in circulation a great deal of money, and there will probably be a general restoration of confidence, which has not yet recovered from the shock of the panic. The presidential canvass is inopportune, but these are exceptional times, and we should not be surprised to see next year an exceptional year in many respects. The country has, we think, accepted the promise of a prompt return to specie payments with satisfaction. Should Congress do nothing to interfere with so much of the treasury policy as has this end in view, the "currency question" will be considered settled. Prices are now well down to the level of a specie basis, and the long deferred hope of a "good spring trade" seems nearer realization now than it has been since the panic.

The gold market has been without important feature, and in the absence of active speculation, the premium has fluctuated within narrow limits. The following is the extreme daily range of the premium since our last report.

	Highest.	Lowest.
Thursday	114⅛	114⅛
Friday	114⅛	114⅛
Saturday	114⅛	114⅛
Monday	114⅛	114⅛
Tuesday	114⅛	114⅛
Wednesday	114⅛	114⅛

The bond market is strong, as are desirable railway mortgages, notably New York Central 7s. We give below the closing quotations of governments.

In the stock market, which has been dull and heavy in the main, the principal dealings have been in Lake Shore, Northwestern, Union Pacific, Western Union, Ohio and Mississippi, and St. Paul. We give below the closing quotations of active shares.

The last bank statement, although showing a large reduction in the legal tender average, shows but a small reduction in surplus reserve —$53,300. Of course, the loss of legal tender notes is due to the shipments of currency to the interior. The following is a comparison of the bank averages for the past two weeks:

	Dec. 4.	Dec. 11.	Differences.
Loans	$271,006,500	$268,390,400	Dec.. $2,616,100
Specie	15,157,500	16,539,400	Inc... 1,381,900
Legal tend's	45,680,300	43,320,900	Dec.. 2,359,300
Deposits	210,663,300	206,966,900	Dec.. 3,696,400
Circulation	18,750,600	19,118,300	Inc... 367,700

The following tables show the movements in foreign trade for the week:

IMPORTS.

	1873.	1874.	1875.
Total for week	$4,519,164	$5,531,358	$4,961,413
Prev. reported	364,459,112	365,146,528	305,444,232
Since Jan. 1	$368,978,276	$370,677,886	$310,345,645

Among the imports of general merchandise were articles valued as follows:

	Quant.	Value.
Anvils	200	$2,000
Brass goods	9	2,508
Bismuth	1	476
Bronzes	36	7,715
Chains and anchors	74	3,536
Copper		6,798
Cutlery	56	21,669
Guns	13	4,558
Hardware	11	1,319
Iron, pig, tons	370	9,139
Iron, sheet, tons	8	833
Iron, cotton ties	811	2,064
Iron tubes	880	1,391
Iron, other, tons	26	1,748
Lead, pigs	1,715	10,847
Metal goods	118	12,861
Nails	25	753
Needles	11	3,140
Per. caps	21	3,879
Steel	1,044	10,909
Spelter	224,000	12,176
Silverware	5	1,307
Tin, boxes	11,198	68,834
Tin, 7523 slabs	405,314	73,229
Wire	62	3,867
Zinc	1,719	162

EXPORTS, EXCLUSIVE OF SPECIE.

	1873.	1874.	1875.
Total for week	$5,375,915	$6,541,813	$6,540,980
Prev. reported	282,349,109	269,321,960	238,940,282
Since Jan 1	$287,725,024	$275,863,773	$245,481,262

EXPORTS OF SPECIE.

Total for the week	$261,475
Previously reported	12,359,464
Total since January 1, 1875	$12,620,939
Same time in 1874	6,170,744
Same time in 1873	18,520,688
Same time in 1872	5,505,838

The closing quotations for United States bonds were as follows:

	Bid.	Asked.
U. S. Currency 6's	122½	123
U. S. 6s 1881, reg	119¾	119¾
U. S. 6s. 1881, cou	124¾	125¼
U. S. 5-20 1862, reg	115	115⅛
U. S. 5-20 1862, cou (Called)	115	115⅛
U. S. 5-20 1864, reg (Called)	115	115⅛
U. S. 5-20 1864, cou (Called)	115	115⅛
U. S. 5-20 1865 reg	115¾	116⅛
U. S. 5-20 1865, cou	116	116⅛
U. S. 5-20 1865, new	117	117¼
U. S. 5-20 1865, con	120	—
U. S. 5-20 1867, reg	119¾	119⅝
U. S. 5-20 1867, cou	123	123¼
U. S. 5-20 1868, reg	119¾	119¾
U. S. 5-20 1868, cou	123½	123⅝
U. S. 10-40 reg	117¾	117¾
U. S. 10-40 cou	118¾	118¾
U. S. 5s. 1881, reg	117⅛	117⅛
U. S. 5s. 1881, con	117⅝	117⅝
Central Pacific Gold Bonds	106⅞	107

The following are the closing quotations of active stocks:

	Bid.	Asked.
Atlantic & Pacific R. R. Preferred	3¾	4
Atlantic and Pacific Telegraph	18	19
Chicago & Northwestern	39½	39¾
" " Pref	56	56½
Chicago, Rock Island and Pacific	104	104⅝
Chic., Bur. & Quincy	114¾	115⅛
Col., Ohio & Ind. Cent	4	4⅛
Clev., Col., Cin. & Ind's	58¾	59
Cleveland and Pittsburgh	89¾	90
Chicago & Alton	97⅜	98
" " Pref	105	106
Consolidation Coal	46¼	48
Canton	39	39¾
Del. Lack. and Western	119¾	120
Delaware & Hudson Canal	122½	123
Dub. and Sioux City	69¾	..
Adams Express	102½	103
American Express	57	57½
United States Express	55½	56¼
Wells, Fargo & Co. Express	83¾	84½
Erie	17	17⅛
" Pref	35	..
Harlem	134	134½
Hannibal & St. Joseph	21¾	22
" " Pref	36	..
Illinois Central	96¾	96⅝
Kansas & Texas	7½	8
Lake Shore	61¾	61¾
Michigan Central	60¾	60¾
*Morris & Essex	100¾	102½
Milwaukee & St. Paul	35½	35¾
" Pref.	65¾	66
Mariposa	7¾	8¾
" Pref	8½	9
*New York Central	103⅞	104¼
New Jersey Central	105	105½
New Jersey Southern	..	1¾
Ohio & Mississippi	16⅞	17
Pacific Mail	40¾	40⅝
Panama	125	..
Pittsburgh & Fort Wayne	99	99¾
Pacific of Missouri	12¼	..
Quicksilver	18	18½
" Pref	24	24½
St. Louis and Iron Mountain	15¾	16¾
Tol., Wabash & Western	4¾	5
Union Pacific	75¾	75¾
Western Union Telegraph (ex'd)	75¾	76

* Ex dividend.

GENERAL HARDWARE.

There is little if any change to notice in the condition of trade this week. Importers and Manufacturers of Holiday Goods are fairly employed, and in General Hardware there is, perhaps, as much business as can be reasonably expected during the last month of the year.

The National Association of Bolt and Nut Manufacturers held a meeting on Thursday last, at which a committee was appointed to revise the list of Bolts and Nuts and report at their next meeting, which will be held in Philadelphia on the second Wednesday in February next. The Carriage Bolt Manufacturers also held a meeting last week, which was adjourned without disturbing existing rates.

In Foreign Hardware we hear of a good demand for fine Cutlery, both Pocket and Table, and in heavy goods a stronger feeling regarding prices than has existed for some time, without any improvement in demand.

The condition of the Nail market is unchanged since our last report. We continue to quote 10d. at $3 per keg, net. Orders for 200 kegs and over could be placed at a shade better than the above-mentioned price.

The following notices have been issued this day:

Office of ROY & COMPANY.
WEST TROY, N. Y., Dec. 15th, 1875.

GENTLEMEN: A reduction in the price of Strap and T Hinges will be made by us some time during the month of January next.

Yours, very truly, ROY & CO.

NORTH EASTON, MASS., Dec. 15, 1875.

GENTLEMEN: We shall issue circular next month reducing price of Strap and T Hinges. Any goods ordered of us previous to reduction will be settled for at reduced prices fixed upon in January. Hoping to hear from you when in want of Strap and T Hinges, we remain,

Yours, truly, E. W. GILMORE & CO.

The Stanley Works will issue a similar notice to the above. On account of this action the Russell & Erwin Manufacturing Co. quote Strap and T Hinges at discount 50 and 10 per cent.

We understand that the interest of the Russell & Erwin Mfg. Co., in the capital of the Douglas Mfg. Co. has been transferred to Messrs. Flint and R. P. Bruff, and that the R. & E. Mfg. Co. have no further interest in the company except as agents for the sale of their product as heretofore. The quality of these goods has been of late greatly improved, and special attention will be given in the future to the finish of the goods and quality of the stock.

The Middleboro Shovel Company, J. Clark Wilson & Co., agents, have revised their list to correspond with the reduced prices published by Oliver Ames & Sons, and noticed in our issue of the 9th instant. The following are the new prices; the balance of the list is unchanged.

N. B. Sherman Cast Steel Edge Plated Shovels.

Polished.

	Per doz.
Long Handle, Round Point, No. 1	$15·00
" " " No. 2	15·50
" " " No. 3	16·00

Black.

Long Handle, Round Point, No. 1	14·00
" " " No. 2	14·50
" " " No. 3	15·00
" " " No. 4	16·00

Middleboro Steel Edge Plated Shovels.

Polished.

	Per doz.
Long Handle, Round Point, No. 1	$11·50
" " " No. 2	11·50
" " " No. 3	12·00
" " " No. 4	13·50

Black.

Long Handle, Round Point, No. 1	10·50
" " " No. 2	10·50
" " " No. 3	11·00

The discount from their list is 20 per cent., and on Scoops an additional discount of 5 per cent. is allowed. They also allow an extra discount of 5 per cent. to all parties whose net purchases in six months exceed $500.

J. Clark Wilson & Co. have in stock the following sizes of "Globe" Screws, which they offer to the trade at discount 45 per cent.:

⅛ in., Nos. 5, 6, 7, 8; ¾ in., Nos. 6, 7, 8, 9; ⅞ in., Nos. 7, 8, 9, 10, 11, 12; 1 in., Nos. 6, 7, 8, 9, 10, 11, 12, 13, 14; 1¼ in., Nos. 8, 9, 10, 11, 12, 13, 14; 1½ in., Nos. 11, 12, 13, 14, 15, 16, 17; 1¾ in., Nos. 13, 14, 15, 16; 2 in., Nos. 12, 13, 14, 15; 2¼ in., Nos. 16, 18; 2½ in., No. 14; 3 in., No. 16.

The Grilley Mfg. Company have issued a price list for Round and Flat Head Nickel Plated Screws. They have always made Silver and Brass Capped Screws, but Nickel Plated (solid Screws) are new with them. We print below the list referred to, and also their discount sheet, issued under date of the 15th inst.:

THE GRILLEY COMPANY'S PRICE LIST OF ROUND AND FLAT HEAD NICKEL PLATED SCREWS.

⅜ inch.		½ inch.		⅝ inch.		⅞ inch.	
No. 3	$1·44	No. 3	$1·46	No. 4	$1·60	No. 6	$1·76
4	1·46	4	1·50	5	1·65	7	1·96
5	1·50	5	1·54	6	1·70	8	2·08
6	1·60	6	1·65	7	1·84	9	2·26
7	1·74	7	1·78	8	2·00	10	2·54
8	1·88	8	1·92	9	2·20	11	2·72
9	2·04	9	2·08	10	2·45	12	3·00
10	2·25	10	2·30	11	2·54	13	3·40
		11	2·40	12	2·76	14	3·90
		12	2·60	13	3·24	15	4·20
				14	3·52	16	4·52

1 inch.		1⅛ inch.		1¼ inch.		1⅜ inch.	
No. 6	$1·90	No. 6	$2·12	No. 7	$2·78	No. 7	$3·16
7	2·04	7	2·28	8	3·06	8	3·56
8	2·24	8	2·43	9	3·36	9	3·90
9	2·44	9	2·74	10	3·64	10	4·24
10	2·72	10	3·04	11	4·00	11	4·60
11	2·98	11	3·36	12	4·40	12	5·00
12	3·34	12	3·84	13	5·00	13	5·62
13	3·74	13	4·36	14	5·60	14	6·26
14	4·24	14	5·00	15	6·21	15	6·92
15	4·52	15	5·60	16	6·82	16	7·66
16	4·84	16	6·04	17	7·40	17	8·40
		17	6·74	18	8·42	18	9·16
		18	7·70	20	10·00	20	10·76

2 inch.		2¼ inch.		2½ inch.		2¾ inch.	
No. 9	$4·40	No. 10	$5·12	No. 10	$5·72	No. 14	$9·14
10	4·70	11	5·52	11	6·26	16	10·88
11	5·08	12	6·02	12	6·80	18	13·44
12	5·54	13	6·60	13	7·54	20	15 20
13	6·10	14	7·64	14	8·38		
14	7·00	15	8·30	15	9·12		
15	7·64	16	9·28	16	10·06	3 inch.	
16	8·40	17	10·04	17	11·00		
17	9·16	18	11·16	18	12·30	No. 14	$10·10
18	10·10	20	12·32	20	13·78	16	11.60
20	11·36					18	14·50
						20	17·04

They also issue the following revised price list of Brass and Silver Capped Wrought Iron Picture Nails:

		Brass.	Silver.
¾ inch	per gross,	$0·80	$1·05
1 "	"	·84	1·10
1¼ "	"	·90	1·20
1½ "	"	1·05	1·40
1¾ "	"	1·10	1·50
2 "	"	1·40	2·00
2¼ "	"	1·60	2·15
3 "	"	1·90	2·60
3¼ "	"	2·80	2·70
4 "	"	3·00	4·00

NEW HAVEN, CONN., Dec. 15th, 1875.

GENTLEMEN: Herewith we hand you our price list for Solid Nickel Plated (not capped) Gimlet Pointed Wood Screws. These Screws are finished in the very best manner, and are warranted equal to the finest nickel plated work in the market.

We also call attention to our greatly increased discounts on Silver and Brass Capped Screws from our list of March, 1875.

DISCOUNTS.	Per cent. off list.
Round and Flat Head Nickel Plated Screws	50
" " " " Silver Capped "	40
" " " " Brass " "	40
Water Hook Bolts, Wrought Iron, Silver	25
" " Malleable "	35
" " " " " X C Plate	25
" " " " " Japanned	35
Elm City Pad Screws, Silver	60
" " X C Plate	40
" " Japanned	50&15
English style Pad Screws, Capped on Brass	50&10
" " " " " Iron	60
Porcelain Picture Knobs	45
Brass and Silver Capped Picture Nails	50 per cent. off revised list.

To parties who shall have purchased goods of our manufacture to the amount of $500 net, during the six months ending June 30th and December 31st, an extra discount of 5 per cent. on net will be allowed.

On fifty gross of Pad Screws or Water Hook Bolts ordered at one time, an extra discount of 5 per cent. will be made.

TERMS—Cash within thirty days, and payment to be made in funds at par in Boston, New York or Philadelphia. After thirty days, subject to draft at sight, with exchange on New York.

Goods delivered on wharf, or at depot in New Haven.

THE GRILLEY COMPANY.

We invite the attention of the trade to the advertisement of H. Schierloh on the 3rd page. Mr. Schierloh is the patentee and manufacturer of "Schierloh's Cherry Heat Welding Compound," an article which is coming into general use among workers in iron. As an article of merchandise it is handled successfully by a large number of dealers in Hardware and Iron both in the United States and Canada, and we know whereof we speak when we say that the demand for this Compound has reached very handsome proportions, and is steadily increasing. It is put up in packages of 1, 5, 10, 50 and 100 pounds, and can be obtained from any of the houses mentioned in the advertisement, or by addressing the manufacturer at No. 24 Exchange Place, Jersey City, N. J.

Chas. E. Little, No. 59 Fulton street, has issued the following revised list for some of his specialities, which is subject to discount 15 per cent.:

SOLID CAST STEEL AUGERS.

Pump Augers, Solid Cast Steel	per ⅛ inch	$1·25
Pump Reamers, Taper, Solid Cast Steel	per ⅛ inch	0·75
Pump Reamers, Straight, Solid Cast Steel	per ⅛ inch	1·25
Sockets for Pump Augers or Reamers, with Rod, 18 inches long, for welding	each	4·00
Fitting Sockets to Augers, with Key	each	2·00
Eye or Ring Handles, for Pump Augers or Reamers, with Rod 15 inches long, for welding	each	3·50
Rods 10 feet long for connecting Sockets and Eyes, Diameter 1¼ inch	each	4·50
" " 1⅛ "	"	5·00
" " 1⅜ "	"	6·00
Socket and Ring Handles fitted to Pump Augers and Reamers, with any length of Rod desired—To order.		
Tenon Tools for Pointing Logs, Wood Block for hand	each	12·00
Tenon Tools for Pointing Logs, Iron Block for Power	each	30·00
Hub Reamers, with Gimlet Point and Screw to 20 in. in length of Pod	per ⅛ inch,	1·40
Hub Reamers, with Gimlet Point and Screw to 22 inches	per ⅛ inch,	1·50
Hub Reamers, with Gimlet Point and Screw to 24 inches	per ⅛ inch,	1·75
Hub Reamers, without Gimlet Point and Screw, 18 inches	per ⅛ inch,	1·00
Hub Reamers, without Gimlet Point and Screw, 24 inches	per ⅛ inch,	1·25
Hub Augers, Solid Cast Steel, to 14 inches in length of Pod	per ⅛ inch,	·75
Rafting Augers, Solid Cast Steel, with extra long Shank and Eye for Handle, Pod 12 in. in length	per ⅛ inch,	·75
Rafting Augers, same as above, 14 inches in length	per ⅛ inch,	·75
Carpenters' Augers, Solid C. S.	" "	·30
Millwright " " "	" "	·45
Machine " with Spurs	" "	·40
" " from ⅛ to ⅝ inch diameter	each,	1·00
Spout Augers, with Spurs	per ⅛ inch,	50
Working Box Augers	each,	6·00

Sargent & Co. have issued the following postal card:

NOTICE.

Mallory, Wheeler & Co. have this day advanced the list price of all 3½, 4 and 4½ inch Mortise Knob Locks with Iron fronts (Handed, or either kind of Reversible, without regard to the kind of keys or bolts) 50 cents per dozen; all of same sizes of Locks with Brass fronts, $1·50 per dozen.

All Mortise Front Door Locks, Handed or Reversible, Plain or Rabbeted fronts, with 5-16 inch hub for straight spindle, $4 per dozen; Vestibule Latches to match above Front Door Locks, $3 per dozen.

We shall forward you, early in January, a new and corrected price list,

SARGENT & CO., Agents,
No. 37 Chambers street.

New York, Dec. 7, 1875.

We give below, in numerical order, with new list prices, the numbers of Locks changed by the above notice:

No.	Per doz.	No.	Per doz.	No.	Per doz.
41	$37·00	581	$10·50	971	10·00
43	47·00	583	8·00	972	12·00
53	56·00	0583	8·00	973	14·00
53½	68·00	584	12·50	974	9·00
71	19·50	587	14·50	975	11·00
071	18·50	702	21·50	976	13·00
79	8·50	703	19·50	977	15·00
81	7·00	779	6·00	979	12·00
83	10·50	781	10·00	980	14·00
83½	12·50	783	7·50	981	16·00
87	16·50	784	12·00	986	16·00
91	22·50	787	14·00	987	14·00
091	21·50	879	7·00	988	12·00
153	52·00	881	11·00	989	10·00
153½	64·00	883	8·50	991	8·50
179	7·50	884	13·00	993	7·50
0179	7·50	887	15·00	993½	9·00
181	11·50	953	48·00	994	6·50
183	9·00	953½	33·00	994½	8·00
0183	9·00	954	50·00	995	8·50
185	13·50	954½	35·00	996	10·50
187	15·50	955	52·00	997	12·50
189	10·50	955½	37·00	998	14·50
191	9·00	956	56·00	999	9·50
541	41·00	956½	41·00	1000	11 50
543	51·00	957	60·00	1001	13·50
553	60·00	960	6·00	1006	15·50
554	72·00	960½	7·50	1012	12·50
579	6·50	964	7·00	1013	14·50
0579	6·50	964½	8·50	1018	16·50

The Branford Lock Works have made the list price on the following numbers of their Locks as follows:

No.	Per doz.	No.	Per doz.	No.	Per doz.
49	$47·00	556	$8·50	809	$12·00
50½	37·00	560	10·50	810	6·00
51	45·00	561	12·50	812	7·50
51½	33·00	562	14·50	814	7·00
52½	35·00	570	8·00	816	8·50
180½	52·00	572	9·50	820	7·50
181	57·00	575	11·50	822	9·00
181½	48·00	578	13·50	823	11·00
182½	50·00	580	15·50	824	15·00
194	72·00	581	10·50	825	13·00
502	41 00	582	12·50	827	16·00
502½	41·00	583	14·50	828	19·00
503	51·00	584	16 50	0180	60·00
503½	51·00	585	19·50	0193	72·00
510	6·50	800	10·00	0580	19·50
512	8·00	801	12·00	0581	21·50
514	7·50	802	8·50	0582	18·50
516	9·00	805	6·50	0582½	16·50
547	56·00	806	8·00	0583	25·50
548	6·00	807	10·00	0584	31·50
555	7·00	808	14·00		

The Norwalk Lock Company have changed the list of the following numbers:

LOCKS.

No.	Per doz.	No.	Per doz.	No.	Per doz.
280	$10·00	465	$12·50	535	$ 9·00
282	41·00	470	14·50	540	10·50
290	56·00	471	11·00	545	12·50
295	52·00	472	13·00	555	14·50
300	60·00	474	15·00	558	16·00
302	41·00	475	7·50	560	16·50
303	37·00	480	9·50	565	19·00
345	68·00	485	11·50	570	25·50
348	47·00	490	13·50	575	27·00
350	72·00	495	15·50	576	16·00
400	6·00	496	15·00	578	16·50
402	7·50	498	15·50	580	19·50
418	8·00	500	18·50	585	22·50
422	10·00	515	21·50	586	22·50
428	12·00	525	18·50	588	27·00
432	14·00	530	21·50	590	28·50
450	6·50	532	8·50	595	31·50
455	8·50	533	10·00		
460	10·50	534	12·00		

KNOBS.

No.	Per Doz.	No.	Per doz.	No.	Per doz.
316	$5·00	425	$3·00	435	$7·25
317	5·00	426	3·00	436	7·25
420	2·25	430	6·75		
431	2·25	431	6·75		

FANCY ORNAMENTAL IRON BRONZED DOOR LOCKS.

No.	Per doz.	No.	Per doz.	No.	Per doz.
0025	$4·75	00288	53·00	00385	$11·50
00177	6·50	00289	49·00	00486	11·00
00178	8·00	00290	55·00	00485	13·00
00179	11·00	00295	51·00	00545	14·00
00210	25·50	00301	38·00	00565	17·00
00215	19·50	00302	40·00	00586	29·50
00219	6·50	00303	36·00	00602	18·50
00219½	5·00	00304	34·00		
00224	8·00	00375	10·25		

The Norwich Lock Mfg. Co. have issued the following memorandum of changes in the list prices of their Locks.

No.	Per doz.	No.	Per doz.	No.	Per doz.
155	$6·00	181½	$21·50	272½	51·00
155¼	6·00	185	14·50	273	72·00
156	12·00	186	16·50	274	68·00
156½	12·00	186⅛	25·50	274½	51·00
157½	14 00	187	19·50	275	72·00
158¼	7·50	187⅛	28·50	No.	Per set.
158⅜	10·00	188	22 50	252	6·75
165	6·50	188⅛	31·50	252½	6·75
165⅛	6·50	190	10·50	253	7·08
165½	7·00	191	12·50	253½	7·08
166	8·00	195	14·00	255	7·42
166¼	8·00	196	16·00	255½	7·42
166⅜	8·50	197	19·00	256	8·08
167	10·50	198	22·00	256½	8·08
167⅛	10·50	205	10·00	257	8·42
168	12·50	206	12·00	257¼	8·42
169	14·50	252	48·00	260	7·42
170	7·00	252½	34·00	260½	7·42
171	8·50	253	50·00	261	8·08
172	11·00	253⅛	35·00	261½	8·08
173	13·00	255	52·00	262	8·42
174	15·00	255½	37·00	262½	8·42
175	7·50	256	56·00	265	9·83
175¼	7·50	256½	41·00	265¼	9·83
176	9·50	257	60·00	266	9·33
176¼	9·50	260	52·00	266½	9·83
176⅜	9·50	260½	37·00	267	8·50
177	11·50	261	56·00	267½	8·50
177⅛	11·50	261½	41·00	272	9·92
178	13·50	262	60·00	272½	9·92
178⅛	13·50	265	69·00	273	10·25
179	15·50	266	63·00	273½	10·25
179⅛	15 50	266½	44·00	274	9·92
180	18·50	267	57·00	274½	9·92
180½	18·50	267½	45·00	275	10·25
181	21·50	272	68·00	275¾	10·25

BRITISH IRON MARKET.

(Specially reported by cable for The Iron Age.)

WEDNESDAY, Dec. 15, 1875.

Scotch Pig.—Since last Wednesday prices have fluctuated in both directions, but the market is now steady, and there is a good business doing. The following are makers' quotations:

Gartsherrie No. 1	74/
Cottness No. 1	77/6
Glengarnock No. 1	70/
Eglinton No. 1	64/6

Manufactured Iron and Rails are without change.

IRON.

American Pig.—The market continues in much the same state as at our last writing, except that $23 is better established as the price for any considerable quantity; while for small lots $23·50 @ $24 are often obtained. The discrepancy in the statements in regard to prices by different companies makes it more difficult to report the market than in ordinary times, but we still adhere to the opinion that lower prices have been accepted than those reported. We hear of a number of small sales, but nothing of importance, except 1500 tons No. 1 Foundry, Thomas, at $23, and 800 tons No. 2 Foundry, Thomas, at $21. Forge seems to be scarce. We quote No. 1 Foundry, $23; No. 2 Foundry, $21; Gray Forge, $15·50 @ $20.

Scotch Pig.—The market continues without change; it is well sustained in Glasgow, and the smallness of stocks here keeps prices firm. The arrivals since our last have been about 200 tons. We note sales of 100 tons Coltness and 100 tons Glengarnock on private terms, and 50 tons Eglinton at $30. We quote: Coltness, $33; Glengarnock, $31; Gartsherrie, $32·50; Eglinton, $29·50 @ $30. The market is bare of Summerlee.

Rails.—We still quote American $42 @ $46, at works, according to quality and location. There have been some large inquiries for Steel Rails, and some considerable sales are reported. We quote Steel Rails $67 @ $68·50.

Old Rails.—The sale at $22·50, reported some time ago, is the last that has taken place in this market, and we still continue our nominal quotation of $22·50 @ $25.

Scrap.—There is nothing doing, and we quote, nominally, $30 @ $31.

METALS.

Copper.—The market has been quiet, sales not exceeding 350,000 pounds Lake Superior, on the spot, at 23⅜c. @ 23½c., the greater part at the inside figure. Baltimore is quiescent at 23¼c., nominally. On Sunday last the Ansonia Copper Rolling Mill was destroyed by fire, but manufacturing will not be in any way lessened thereby, business in the Naugatuck Valley not being brisk. The firms in the valley always assist each other in cases of a sudden emergency, and what has to be done will be temporarily performed by neighbors. In times of great activity this might not have been so easily accomplished. So far as we have been able to ascertain, up to date, the general production of Copper in the United States has exceeded that of last year by but about 1,000,000 pounds; we have exported a little over 7,000,000 pounds, and the stock at the end of the month will in all likelihood foot up 12,000,000 pounds. Considering everything, this will be a favorable result. As we have mentioned before, people in the Metal trade in England were under the erroneous impression, early the present year, that we should be able to spare them at least 7000 tons of Copper; this prospect was held out to them from here. Unless our production increases in a manner beyond precedent, we shall have, in a year of normal activity, but comparatively little Copper to spare. On Saturday, London cabled Best Selected £89, and Chili Bars £81. 10/. The manufactures of Copper are unchanged, as follows: New Sheathing, 30c.; Bolts and Braziers, 31c.; Nails, 38c. @ 39c.; Bronze and Yellow Metal Sheathing, 21c.; Yellow Metal Bolts, 28c., and do. Nails, 21c., net. cash.

Tin.—There have been no new features of interest, the market being very quiet at the following gold quotations for large lots: Straits, 19¼c.; English Refined, 19¼c. @ 19½c.; ditto Common, 19c.; and Banca, 23½c. London cables Straits Tin £82. 10/. Singapore remains at $23. The low quotations at Singapore sufficiently indicate that the difficulty at Perak causes no serious apprehensions. This places Tin once more on a purely commercial basis of demand and supply. The demand, as shown by the deliveries to consumption in November, has abated somewhat, whereas the supply on hand was ample, especially at London, and both Australia and

Missouri. As an instance, we mention the St. Joseph Lead mines, of Cadet, Missouri, whose 11th annual report shows that the company turned out 54,526 pigs, an increase of 18,236 pigs over the previous year. The manufactures of Lead have been steady at the following rates: Bar, 8¾c.; Pipe, 9c., and Sheet, 9½c., less 10 per cent. dicount.

Spelter and Zinc.—Domestic Spelter has been but moderately active; the price nominally upheld is 7·40c., currency, less 1 per cent., but some sales seem to be still making at a larger discount. As for Foreign, we have no fresh transactions to report since our last, either "spot" or "futures," and quote the market nominally, 7·15c. @ 7·37½c., gold. The present stock of Foreign is 150 tons. We are not in receipt of later news from Europe. *Sheet Zinc* remains quiet at 8⅞c. @ 9c., gold.

Antimony.—A moderate demand prevails at 14c. @ 14½c., gold, according to quantity, for Foreign.

IMPORTATIONS.

Of Hardware, Iron, Steel and Metals into the Port of New York, for the week ending Dec. 14, 1875:

Hardware.

Alexander E. L.
  Wire rods, lots., 273
Ameon Louis,
  Cases, 5
Boker Hermann & Co.
  Gun caps, cs., 10
  Mdse. pkgs., 43
  Arms, cs., 23
Degraw, Aymer & Co.
  Chains, 1
  Casks, 6
Frasse P. A. & Co.
  Mdse. pkgs., 1
  Wire, pkgs., 8
Friedmann & Lauterjung.
  Mdse. pkgs., 3
Findlay Wm.
  Files, cks., 6
Field A. & Co.
  Casks, 6
  Skeleton machine cs., 2
  Cases, 1
Hutchinson T. W.
  Arms, cs., 2
Haigh J. Lloyd,
  Wire rods, bdls., 111
Laughland & Co
  Netting, cs., 4
  Wire, pkgs., 28
Lau & Garlichs,
  Mdse. pkgs., 2
  Arms, cs., 11
Moore's J. P. Sons,
  Gun caps, cs., 6
Merchants Dispatch Co.
  Arms, cs., 10
  Casks, 2
Remington E. & Sons,
  Guns, cs., 5
  Gun barrels, cs., 7
Schoverling & Daly,
  Mdse. pkgs., 2
  Arms, cs., 3
Steglisch Julius,
  Nails, baskets, 4
Struller Louis,
  Arms, cs., 6
Sanders W.
  Cases, 3
Sulzbacher & Heyman,
  Wire, pkgs., 52
Wiebusch & Hilger Mfg. Co.
  Chains, cks., 60
  Casks, 4
Ward A.
  Mdse. pkgs., 2
Windmuller L. & Koelker
  Arms, cs., 3
Order.
  Casks, 1

Iron.

Douglass Jas.
  Scrap, tons, 20
Laughland & Co.
  Haybands, bdls., 425
Mitander Nils,
  Bars, 1902
Marvel Wm. D.
  Ore, tons, 360
Mason John W. & Co.
  Wire rope, coils, 4
Prosser Thos. & Sons,
  Tubes, bdls., 22
Pierson & Co.
  Packages, 4169
Sampson G. G.
  Pig, tons, 100
Schmeisser & Bender,
  Spiegel, tons, 200
Wheeler E. S. & Co.
  Bars, 5607
Yates & Porterfield,
  Scrap, tons, 76
Order.
  Pig, tons, 100
  Plates, 145
  Bars, 20,827
  Spiegel, lots, 1
  Rods, bdls., 1074
  Cases, 12
  Sheet, bxs., 31

Steel.

Brown, Shipley & Co.
  Bars, 199
Brown Wm.
  Bundles, 347
Findlay Wm.
  Bundles, 435
  Bars, 10
Jung & Co.
  Bundles, 2
Naylor & Co.
  Tires, 12
  Axles, 1
  Cases, 12
  Bars, 20
  Bundles, 6
Saxton & Seabury,
  Cases, 1
Sulzbacher & Heyman,
  Tires, 4
Woodford W. O.
  Cases, 82
  Bundles, 110
West, Bradley & Cary, Mfg. Co.
  Wire rods, bdls., 94
Order.
  Scrap, tons, 40
  Bundles, 71
  Bars, 626

Metals.

Blumenthal I. & A.
  Cases, 1
Brown Bros. & Co.
  Tin, slabs, 506
Byrne Joseph & Co.
  Tin plates, bxs., 208
Bruce & Cook,
  Tin plates, bxs., 145
Cort N. L. & Co.
  Tin plates, bxs., 238
Douglass Jas.
  Scrap, bbls., 7½
Dovale & Co.
  Scrap, copper, bdls., 1½
Dickerson, Van Dusen & Co.
  Tin plates, bxs., 2278
Eneas Jos.
  Scrap, copper, lbs., 181
  Scrap, brass, lbs., 1191
Grund F. & Cerero,
  Lead, pigs, 200
Heye C. & Co.
  Zinc, cks., 11
Jannsson & Co.
  Tin, ingots, 280
Jackson R. D.
  Bar tin, bales, 5
Naylor & Co.
  Tin plates, bxs, 470
Phelps, Dodge & Co.
  Tin plates, bxs., 8565
  Black taggers, bxs., 300
Order.
  Tin plates, bxs., 3639
  Tin, ingots, 1260
  Antimony, cks., 50
  Lead, pigs, 4213
  Black taggers, bxs., 8
  Tin and terne plates, bxs., 315
  Terne plates, cs., 49
  Tin, slabs, 50
  Scrap, bbls., 4

COAL.

The fiscal year of the coal trade for 1875 is virtually at an end. The production since the late opening of the strike has been steady, with the exception of a partial suspension during one week in November. The total shipment for the year exceeds 23,000,000 tons. This is remarkable when the dullness of the iron trade is considered. Furnaces, rolling mills and iron works of all kinds are generally considered the best customers of the coal trade; and yet, with half the furnaces out of blast and a corresponding depression in other branches of the iron business, the production has not only been maintained but increased.

The quantity sent from all the regions during the week was: 375,361 tons Anthracite, and 85,881 tons Bituminous; total, 461,242 tons, against 338,540 tons Anthracite, and 67,447 tons Bituminous; total, 395,987 tons. Increase of Anthracite, 46,821 tons; increase of Bituminous, 8434 tons. Total increase, 55,255 tons.

The quantity sent from all the regions so far this year is 23,085,057 tons, against 22,721,182 tons for the corresponding period last year. Increase, 363,875 tons.

An important meeting of the Schuylkill Coal Exchange was held in the office of the Philadelphia Coal and Iron Company, in the city of Philadelphia, last Wednesday (Dec. 8). Nearly every operator of any consequence working in the region was present, and over 100 collieries, including those owned or leased by the above corporation, were represented. The situation was thoroughly discussed, and it was finally resolved to suspend production from December 18 to January 23. It was also agreed to allow the Philadelphia and Reading Coal and Iron Company to run enough collieries to supply their own furnaces, mills and the Reading Railroad Company service.

We quote as follows: Anthracite, $4·95 @ $6·10; Cumberland, $6·25 @ $6·75; West Virginia, $6·75; James River Steam, $6·25; James River Carbonite, $9 @ $9·50; Kanawha House, $11·50; American Gas, $6·75 @ $7·25; American Cannel, $12 @ $14; Pennsylvania and Westmoreland, $6·75; Newburgh Orrel, $6·50; Sterling Ohio, $10; Ince Hall, $17 @ $18; Liverpool House Cannel, $17; Liverpool Gas, $12; Newcastle Gas, $7; Scotch, $7·60.

The Coal transported over the Cumberland Branch Railroad during the week ending Dec. 11, 1875, amounted to 3524 tons, as against 3432 tons shipped in the corresponding period of last year, showing an increase of 92 tons. Over the Cumberland & Pennsylvania Railroad, for the same period, the shipments were 26,386 tons, against 18,509 tons shipped in 1874, an increase of 7877 tons. The aggregate amount of Cumberland Coal shipped by the various companies so far this year amounts to 2,226,690 tons.

OLD METALS, PAPER STOCK, &c.

Old Metals are as dull as we have noted heretofore. Consumers are diffident about purchasing, and only present wants are considered. Our quotations remain the same as last reported, with the exception of White Rags, No. 1, which have declined half a cent a pound. The market for Grass Rope still continues in good demand, but prices have a downward tendency. We quote the following as the current purchasing rates:

Old Metals.—Copper, 16c. @ 17c. per lb.; Yellow Metal, 11c.; Brass, 10c. @ 13c.; Composition, heavy, 13c. @ 14c.; Lead, solid, 5½c.; Tea Lead, 5c.; Zinc, 4½c. @ 4¾c.; Pewter, No. 1, 18c.; do., No. 2, 8c. @ 12c.; Spelter, 5¾c., Wrought Iron, 1c.; Sheet do., ¼c.; Cast, do., ⅜c.; Machinery, do., ⅝c.

Rags, &c.—Canvas, Linen, 4½c. @ 5¼c.; do. Cotton, No 1, 5¾c. @ 6¼c.; No. 2, 2½c.; White, No. 1, 5¾c.; No. 2, 4c.; Colored, do., 2c. @ 2½c.; Mixed, Woolen, 2c. @ 3c.; Soft, do., 5c. @ 5½c.; Gunny Bagging, 1¾c.; Jute Butts, 1¾c. @ 2c.; Kentucky Bagging, 3c.; Book Stock, 3c.; Waste Paper and Scraps, 1¾c.; Kentucky Bale Rope, 4c.; Oakum Junk, No. 1, 4¼ @ 5c.; do. No. 2, 3c.; Tarred Shaking, 1c. @ 1¼c.; Grass Rope, 2¾c. @ 3c.

PHILADELPHIA.

PHILADELPHIA, Dec. 14, 1875.

The market continues without change, prices being a little stiffer than last week, or with certainly less disposition to shade than has been noticeable. The settlement of the difficulties between mill owners and puddlers at Pittsburgh by compromise, in which the manufacturers conceded 25 cents a ton more than they expected to, argues that they believe bottom prices have been reached, and that better prices are at hand. Bars are dull, and it looks as if prices would soon reach those paid before the war, if they have not already. In Plates there is a comparatively fair business, and a prospect of some activity in shipbuilding all winter. Old Rails are softening under the news of the settlement of troubles at Pittsburgh, and prices are quotably lower.

There is a fair business in Wrought Scrap, and an active one in Cast, at quotations. We quote rates current as follows, viz.:

PIG IRON.—No. 1 Foundry, $23 to $23 50; No. 2, $21; Gray Forge, $20.

BARS.—2·4c. per lb.

RAILS.—$42 to $46, at works, East.

STEEL RAILS.—$67 to $69.

SCRAP.—$28 to $29 for No. 1 Wrought, and $18 to $20 for Cast.

Among the sales we note those of 1200 tons No. 1 Foundry at $23·50; 4000 tons No. 2 at $22; small sales of Forge at $21 to $21·50. *Old Rails.*—500 tons, spot, at $25, and 600 tons, East, at $22. *Wrought Scrap.*—250 tons at $28, and 200 tons Cast at $18. Market closes quiet.

PITTSBURGH.

PITTSBURGH, Dec. 14, 1875.

PIG IRON.—There is no improvement to record; nor is it at all likely that there will be before next month; some well informed operators do not expect any decided improvement until toward spring. The demand, what little there is, is restricted to supplying actual pressing necessities; some of the mills have already stopped their puddling furnaces, others will do likewise during the next few weeks, and the consumption of the raw article will be very much reduced during the time in question. Prices continue weak and in buyer's favor; the offerings are light, but this is not strange, as sellers know that the market, in its present condition, cannot be forced, that there is but a certain quantity wanted, and that no inducement, short of a sacrifice, would tempt buyers to go beyond their present wants. Standard Mill Irons may be quoted at $21·50 to $22, cash, and $22·50 to $23, 4 mos; however, as already intimated, it would be impossible to place a round lot at quotations. No. 1 Foundry, $25 to $26; No. 2, ditto, $23 to $24; White and Mottled, $20 to $21; Charcoal, $22 to $23, for Mill; $27 to $29, for No. 1 Foundry; $30 to $35 for Eastern Cold Blast Car Wheel, and $40 to $50 for Western ditto.

MANUFACTURED IRON.—There has been no important change in the situation during the past week. Trade continues exceedingly dull, orders are coming forward very sparingly, and prices are down lower than they have been at any time since the war. Sales are making in a jobbing way at 2¼, 60 and 90 days, for bars. The manufacturers and puddlers have not as yet been able to agree upon the price to be paid for puddling. The probability is that if the latter refuse to accept the $4·50, that there will be a "lock-out," as the manufacturers say they cannot and will not pay any more. The mills are in a much better shape for a lock out now than they were at this time last year, and the puddlers, no doubt, understand this.

NAILS.—There is no improvement to report in the Nail trade, nor is it likely that there will be for some time to come. A pretty general suspension during the next month, perhaps six weeks, is not improbable. Prices continue weak and drooping; quotations may be given at $2·75, 60 days, with 2 per cent. discount for cash.

STEEL.—The general position of the market has not varied much recently, with the exception that orders are not as plenty as they were, but this is usually the case in December; trade will, no doubt, pick up next month. The mills here in Pittsburgh have been working steadily all this year, some of them up to their full capacity, and while the margin for profit has been small there is reason to believe that they have all made a little money.

NO "LOCK-OUT."—The manufacturers after repeated conferences in regard to the price to be paid for puddling, came to an agreement on Saturday night, hence there is no cause to apprehend a lock-out for the present, and not only parties interested, but the community at large have great reason to be thankful, as the stoppage of the mills would have thrown a great number of persons out of employment, and would have caused a great deal of suffering. The manufacturers offered $4·50, and the puddlers demanded $5, but a compromise was effected and the following agreement entered into: That on and after Monday next, the 13th of December, until the 14th day of February, 1876, the price for boiling shall be $4·75 per ton. It is understood, however, that any mill, whose notice has not expired, shall continue to pay $5 per ton until the expiration of the agreed thirty days. That the conference adjourn to meet at the call of either of the chairmen.

This was signed by Joseph Bishop on the part of the puddlers, and Henry W. Oliver, Jr., on the part of the manufacturers.

The Pittsburgh *Commercial* of Dec. 11 says: Trade during the week has been exceedingly dull. We have never noticed less inclination to operate. Buyers seem utterly indifferent about purchasing even at the present low figures. The end of the year is approaching, hence consumers are disposed to reduce their stocks of raw iron down to the lowest possible amount. The misunderstanding between the iron workers continues. How it will terminate is uncertain. So far as prices are concerned we have no change to report. The sales are unquestionably the lightest we have reported for a long time. We are reported the following sales:

BITUMINOUS COAL SMELTED FROM LAKE SUPERIOR ORE.

100 tons close and mottled.....Private terms.
30 tons No. 1 foundry .....$27·00—4 mos.

CHARCOAL.

100 tons No. 2 foundry, H. R.....$25·00—4 mos.
60 tons grey forge, H. B.....23·00—5 mos.
115 tons No. 1 mill.....Private terms.
50 tons No. 2 H. R.....Private terms.

CONNELLSVILLE COKE.

30 tons gray forge.....$21·50—cash.
20 tons No. 2 foundry .....24·00—4 mos
10 tons No. 1 foundry.....25·00—4 mos.

MERCHANT BAR IRON AND NAILS.

The condition of the market for finished iron is not materially altered, unless it may be that a more complete depression now exists throughout the entire market for standard shapes and sizes than was the case during the fall. The prospect for the winter is exceedingly unfavorable just at present, the demand being very slack and the outlook for the trade gloomy, apart from the threatening appearance of the wages dispute between the employers and the boilers. The usual dullness which takes place at this season of the year is hardly more than could have been expected, and would not be a ground for much complaint were it not accompanied by considerable weakness in prices, caused, it would seem, by the necessities of makers, who are forced to rather extreme concessions in order to secure sales. There is still reason to hope for an improved demand with the opening of the new year. The darkest night has turned out to be just before morning, more than once before, in the history of the iron trade; and it is to be hoped that such may prove to be the case now. But the only course at present left manufacturers is to reduce as much as possible on the cost of production. The market for bar iron during the past week has ranged from 2·15c. to 2·25c. on the usual orders, with some transactions at even a concession from these prices, and jobbing sales at about 2 4-10c. to 2 5-10c. The card has become practically a dead letter. Nails are still quiet, but there is a moderate order trade from the Northwest, chiefly of a small character, but in sufficient volume to cause some movement. Business is done on a basis of $2·75 to $2·85 per keg for round lots, with jobbing business at 20c. to 25c. advance. The steel trade moves steadily, the manufacturers generally experiencing a fair demand, which keeps the works in employment. Prices, however, are said to be cut down to an insufficient margin of profit, so that the trade is not wholly satisfactory. There is a demand for rails, and while prices are closely figured down, this branch of industry is in a more satisfactory condition. Quite a number of orders are pending, to be closed by the first of the year. We notes sales of 4000 tons at $48, delivered at works at Philadelphia. Steel rails are especially active. All the mills are kept busily employed, and from present indications this branch of industry will not suffer from a lack of orders. The great durability of steel rails is now so universally recognized by railroad men that they are being substituted for iron by all the leading trunk lines. Quotations are unchanged at $67 per ton here.

BOSTON.

DEC. 11.—*Pig* has had a very dull week. The offers from New York on choice and fancy brands No. 1 fluctuate from $22·50 to $23·25 a ton, f. o. b., while less prominent makes are quoting down to $22. This has still further tended to break up our market and turn buyers into the most disconsolate and dilatory moods. The stock on wharf here is still ample, though the receipts are very light. There is no change in the quotations brokers and dealers here make, the inside figures representing the more immediate figures at which sales f. o. b., are to be made. No. 1, $24 to $26; No. 2, $22 to $24; Gray Forge, $19 to $21. The rumor current that a heavy lot of hypothecated iron was likely to be closed out, proved to be a fact late Friday night. The iron all goes into consumption. It sold at a very low figure, which was necessary in order to meet New York and Philadelphia quotations. *Bar* lost its lethargy on Monday morning, when a leading house openly announced guaranteed refined iron at $52·50, 2240 lbs. to the ton. For a week or so past there have been rumors of an irregularity in prices, but traceable to no head. Therefore, when this $2·50 a ton let down was made the surprise was intense. The stocks offering at these quotations are not light nor broken. They have attracted buyers from every part of New England, and possibly no week for a year has been more active, considering the amount of iron jobbed. This value is a trifle less than 2¾c., currency per pound; that exact quotation would be $53·20 a ton. Considering gold at 115, the present currency price being $52·50, the gold rate would be $44·62. At 2c. per pound the ton would cost $44·80. We make these comparisons that the reader may intelligently understand just how low our market has gone. Very few of our jobbers recall prices, even before the war, at 2c. a pound, and scarcely a carriage maker or blacksmith has bought lower than 2½c. refined iron. The boast of England has been that her iron has in times past sold at a penny sterling a pound; ours is likely to be yet as good, that is, if the competition continues. This circumstance re-emphasizes what has been said previously of Pig. Boston is probably the lowest priced iron market in the country. In common iron there have been sales of 50 tons at $50; but even this now is comparatively an extravagant price. *Steel* is having a fair business. An effort was made to break the market on machinery by quoting Atlantic 8c., but this brand is being closed out, the choice of sizes gone; and so, not representing an average assortment, the effort failed of success. There is a little more doing in Tool Steel and a small inquiry for Boiler Plates again. We quote: American Tool, 14c. to 15c.; American Machinery, 9c. to 9½c.; Bessemer Tires, 6¾c. to 7¼c.; Sweet's Excelsior Tire, 8½c. to 12c.; English Tool, 16c. to 18c., gold. *Copper* is very dull, not even a speculative inquiry being made at any price. The manufacturers report light sales, and consequently are quite indifferent to buyers at the current quotations, which are 23¾c. to 23½c. for either spots or futures, according to the quantity. However, if there is any concession discoverable, it is in the way of spot lots. For manufacturers we quote New Sheathing, 30c.; Bolts and Braziers, 31c.; Yellow Metal Bolts, 20c. to 29c. *Lead* is finding a small jobbing trade at fairly steady prices. The stocks generally are reported light. We quote Pig, 6c. for Domestic, and 6¾c. to 6½c. for Foreign; Sheet and Pipe Lead, 9c., currency; Tin Lined Pipe, 16½c.; Bar Lead, 9c., less usual trade or 10 per cent. discount. *Antimony* is firm, with a better inquiry at 13½c. *Spelter* is strong and quiet at $7·45, 30 days, and $7·35, prompt cash, all currency. Silesian is dull at $7·30. *Tin*, is without change. The sales are in the most trivial way, both in Pig and Plates. We quote Straits, 19¾c.; Banca, 24c.; Refined English, 19¾c. to 20c., gold. Plates are active; we quote Charcoal I. C., $7·25 to $7·75; Coke, $6·50 to $6·75; and Terne at $6·15 to $6·50, gold.—*Com. Bulletin.*

BALTIMORE.

Messrs. WYETH & BROTHER, Iron and Steel merchants, South Charles and Lombard streets, report us the following prices under date of Dec. 14: We continue to report a quiet market with some little movement for early wants, but at close figures. We quote the market dull with unchanged list.

AMERICAN REFINED BAR IRON.

1 to 6 wide by ¾ to 1 thick.. } 2 5-10 to 2 6-10c. ₩ lb.
1 to 4¼ wide by 1¼ to 2 thick }
Round and square, ordinary sizes, from ¾ to 2 inclusive.....2 5-10 to 2 6-10c. "
Hoop Iron, 1½ wide and upward.....3¾ to 4c. "
Band Iron, from 1¾ to 4 in. wide....3 to 3¼c. "
Horse Shoe Iron ¾ to 1 wide by ⅜ to ½ thick.....3¾ to 4c. "
Norway Nail Rods.....7 to 7¼c. "
Black Diamond Cast Steel, Plats, Squares and Octagon, ordinary sizes.....15½ to 16c. "
Machinery Steel.....11 to 11½c. "
Cast Spring Steel.....10 to 10½c. "
Homogeneous Steel Plate.....10½c. "
Perkins' Horse Shoes, per keg of 100 lbs.....$5·12½
" Mule Shoes " " " .....6·12½
Common Horse Nails, from 14c. to 18c per pound.

	10	9	8	7	6	
Putnam Horse Nails..	23	24	25	26	28c.	per lb.
	10	9	8	7	6	
Globe Horse Nails...	23	24	25	26	28c.	per lb.

R. R. Spikes.....5¼ by 9-16 at 2 9-10c to 3c. per lb.

Messrs. R. C. HOFFMAN & Co., Iron and commission merchants, Nos. 23 and 25 South Frederick street, report the Pig Iron market as follows, under date of Dec. 13: We have to report a dull Iron market, without change in prices, and repeat last quotations as follows:

Baltimore Charcoal.....$32·00 @ 35·00
Virginia " .....30·00 @ 34·00
Anthracite No. 1.....24·00 @ 25·00
" No. 2.....22·00 @ 24·00
" No. 3.....20·00 @ 22·00
White and Mottled.....18·00 @ 19·00

CINCINNATI.

Messrs. L. R. HULL & Co., under date of Dec. 13, write us as follows: PIG IRON.—The market remains without material change, prices ruling about as last reported, with a fair demand for all grades.

HOT BLAST CHARCOAL.

Hanging Rock No. 1..₩ ton. $25·00 @ 26·00—4 mos.
" " No. 2..... 23·00 @ 24·00—4 mos.
" " Forge..... 21·00 @ 22·00—4 mos.
Southern Brands No. 1..... 23·00 @ 24·00—4 mos.
" Forge..... 21·00 @ —4 mos.
Virginia No. 1..... 24·00 @ 25·00—4 mos.
" No. 2..... 22·50 @ 23·00—4 mos.
" Forge..... 21·00 @ 22·00—4 mos.

HOT BLAST STONE COAL AND COKE.

Hanging Rock No. 1...₩ ton. $23·00 @ 24·00—4 mos.
" " Forge..... 21·00 @ —4 mos.
Red Short No. 1..... 27·00 @ —4 mos.
" Forge..... 24·00 @ —4 mos.
Am. Scotch, No. 1..... 24·00 @ 25·00—4 mos.

COLD BLAST CHARCOAL.

Hanging Rock Car Wheel ₩ tn. $40·00 @ 50·00—4 mos.
Missouri " " ..... 35·00 @ 40·00—4 mos.
Southern Br'ds " " ..... 30·00 @ 40·00—4 mos.
Machinery and Forge..... 30·00 @ 35·00—4 mos.
Blooms..... .. @ .. —4 mos.

ST. LOUIS.

Messrs. SPOONER & COLLINS, Iron commission agents, 409 North Third street, St. Louis, under date of Dec. 9, report the Iron market as follows: There is no material change in our market. Prices and demand about the same, though the inquiries for supplies during 1876 is increasing, and we look for some advance then. We quote on 4 mos.

Mo. Stone Coal, No. 1 F'dry. $26·50 @ 27·00—4 mos.
" " No. 2 F'dry. 24·00 @ 25·00—4 mos.
" " Gray Mill... 23·50 @ 24·00—4 mos.
" Charcoal, No. 1 F'dry... 26·00 @ 27·00—4 mos.
" " No. 2 F'dry... 23·50 @ 24·00—4 mos.
" " Gray Mill... 23·00 @ 24·00—4 mos.
Tenn. Charcoal No. 1 F'dry.. 25·00 @ 26·00—4 mos.
" " No. 2 F'dry 23·00 @ 24·00—4 mos.
" " Gray Mill.... 22·00 @ 23·00—4 mos.
" Coke Iron No. 1 F'dry.. 25·00 @ 26·00—4 mos.
" " No. 2 F'dry.. 23·00 @ 24·00—4 mos.
" " Gray Mill... 23·00 @ 24·00— 4 mos.
H. R. Charcoal No. 1 F'dry.. 26·00 @ 27·00—4 mos.
H. R. " No. 2 F'dry.. 24·00 @ 25·00—4 mos.
H. R. " Gray Mill..... 24·00 @ 25·00—4 mos.
Massillon Iron, A, No. 1 ..... 34·00 @ 35·00—4 mos.
" " B, No. 1 ..... 32·00 @ 33·00—4 mos.
" " No. 2 ..... 30·00 @ 31·00—4 mos.
Cold Blast Car Wheel, Mo.... 32·00 @ 35·00—4 mos.
" " Tenn. 30·00 @ 32·00—4 mos.
" " Ala.. 30·00 @ 32·00—4 mos.
" " Hanging Rock..... 35·00 @ 40·00—4 mos.
Mo. Charcoal Blooms..... 60·00 @ 65·00—4 mos.
" Scrap " ..... 60·00 @ 65·00—4 mos.
Mo. Charcoal Hammered Billets ..... 80 00 @ 90·00—4 mos.
Assorted Bar Iron..... 2 4-10 rate.
No. 1 Wrought Scrap..... 1c. per lb.
Heavy Cast " ..... ¾c. "
Light Cast " ..... ⅝c. "

CLEVELAND.

Messrs. C. E. BINGHAM & CO., 25 West Main street, under date of Dec. 13, quote the Iron market as follows, 4 mos. time:

FOUNDRY IRON.

No. 1 Lake Superior Charcoal..... $29·50—4 m.
No. 2 " " ..... 29·00—4 m.
No. 1 Anthracite..... 26·50—4 m.
No. 2 " ..... 25·00—4 m.
No. 1 Bituminous..... 26·50—4 m.
No. 2 " ..... 25·00—4 m.
No. 1, Cherry Valley Am. Scotch..... 29·50—4 m.
B—1 " " ..... 27·50—4 m.
No. 2, " " ..... 26·00—4 m.
No. 1 Massillon..... 28·00—4 m.
B—1..... 26·00—4 m.
No. 2..... 23·00—4 m.

CAR WHEEL AND MALLEABLE IRON.

No. 3 Lake Superior Charcoal..... $28·00—4 m.
No. 4 " " ..... 29·50—4 m.
Nos. 5 & 6 " " ..... 29·50—4 m.

BESSEMER IRON.

Nos. 1 and 2 Lake Superior Charcoal.... $29·00—4 m.

FORGE IRON.

No. 1 Gray ..... $23·50—4 m.
White and Mottled..... 23·50—4 m.

RICHMOND.

Mr. ASA SNYDER, Iron Merchant and Furnace Agent, Richmond, Va., writes as follows under date of Dec. 15: About 100 tons Charcoal Iron sold since last report. Market bare. No change in quotations.

Virginia cold blast Charcoal Pig Irons. $27·00 @ 33·00
" hot " " " 24·00 @ 28·00
Va. hot blast Coke Pig Iron, No. 1 ex. 24·00 @ 25·00
" " " " No. 2 ex. 22·00 @ 23·00
" " " " No. 3 ex. 21·00 @ 22·00
Virginia Anthracite. No. 1 ex..... 25·00 @ 26·00
" " " No. 2 ex..... 23·00 @ 24·00

FOREIGN.

FRANCE.

(Moniteur des Interets Materiels).

PARIS, Nov. 28, 1875.—*Metals.*—We are now so close upon the last month of the year, generally devoted to stock taking, balance sheets and windings up of all sorts that not much activity in Metals can be expected even in normal times, much less so during the industrial crisis which Europe still traverses. Many suggestions are forthcoming from all quarters, most of them insisting that wages are too high among us, and that with the general shrinkage in values, they will necessarily have to undergo a further reduction ere European industry can be placed once more on a sound basis. Money in England, as well as on the Continent, has been working more easily; a moderate drain of gold is still experienced in England, the bullion going to France and Germany. Several subjects of general interest have during the week engaged the French press, among others the idea which has been started in Holland and Belgium to establish a customs' union between the two countries. The advantageous character of a reciprocity treaty or union of the kind can hardly be denied. Holland's principal home industry are products of the dairy, gin, &c. She has vast and rich colonies, while Belgium has none, and the latter is exclusively a manufacturing country. There are consequently no clashing interests, and a customs' union would prove highly beneficial to both. Another subject, more immediately important to the world at large, is the financial control which England has secured with reference to the Suez Canal. There is certainly no nation which has a more powerful interest to keep the high road to India under its direct sway, and the commerce of the world will be a gainer by it. *Copper* has been but indifferently well sustained in the European markets, the dealings being on a reduced scale pretty much everywhere. We have remained quiet here, and prices are ill supported, as follows: Chili Bars at Havre, 215 francs; Common do., 210; Ingots, 220; English Tough Cake, 250, and pure Corocoro Ore, 213·75. At Marseilles great weakness again prevails, the revival which we alluded to the other day having been of short duration. A severe drop is, however, not apprehended, the stocks being insignificant. Small Ingots there 215 francs. *Tin.*—Much will depend on the deliveries during the current month in England and Holland, of which we shall possess the particulars in a couple of days. Meanwhile the metal has relapsed into a quiet attitude, all excitement about the Perak disturbances having subsided. We are dull and weak here, and quote Banca, deliverable at Havre or Paris, 235 francs; Straits, 222·50; and English, at Havre or Rouen, 222·50. Marseilles forms an exception, the market there being firm and rising, Straits bringing 225, and Billiton, 223. *Lead.*—At London the market has risen 5/ for Lead on the spot, while forward deliveries have not yet come up to the improvement, but may follow suit. We are firm here at 56·50 francs for French, and 56 Spanish, deliverable at Havre. Although frequent and copious arrivals have taken place at Marseilles, they have been promptly absorbed, and stock does not accumulate. *Spelter.*—The demand for this metal is on the increase, but as the stocks in first and second hands are light, nobody seems willing to part with it, unless it be at a further improvement. We are firm here, and prevailing rates are obtained with ease. We quote all sorts indiscriminately 65·50 francs the 100 kilos. Resmelted Zinc at Marseilles commands 55·50 in Sheets; Vielle Montagne Sheet Zinc we quote 85, other brands, 80. *Iron.*—After some slight fluctuations the market has returned to its previous apathy. Steel remains in a comparatively favorable position, and although it has declined somewhat with the rest during the past month or two, the forges which made it a specialty have thus far gone through the ordeal of the present industrial crisis. *Coal.*—The weather has become cold and boisterous, and snow has fallen without exercising any further influence on Coal, which, on the contrary, has shown signs of weakness. The northern districts have, however, less reason for complaint than the Loire, where Iron industry suffers most.

BELGIUM.

(Revue Universelle).

BRUSSELS, Nov. 28, 1875.—*Iron.*—The situation here continues to be precarious. The advance of a shilling in England in Cleveland Pig Iron has had no corresponding effect among us. At 6·50 francs for Affinage and 8 for Moulage, the Iron master has little inducement to resume operations. Our forges complain that the prices which they get for their product are unremunerative. Wrought Iron they are obliged to sell at 16 francs and Sheet at 23. The only remedy which we can perceive would be a further decline in Coal. We are of opinion that the latter is more than likely, since our Coal mines seem to meet with no resistance in cutting down wages. A subject much discussed in Iron circles is the new process of manufacturing blown Pig Iron, invented by Mr. Fernand Hamoir, of Maubeuge, and practically introduced in the blast furnaces of that locality. *Coal.*—The market has been unusually quiet. Prices in general have varied little, but in special cases a concession has been made. At Charleroi small Coal for Coke has sold at 14 to 15; mixed for forges at 16·50 to 17·50; for domestic purposes at 19·50 to 20·50. At Mons the demand is slack. At Liege, Westphalian Gas Coal is offering at 20·80. Much complaint arises among our Coal companies since summer on account of the discriminating freight which Belgian Coal pays on the Alsace-Lorraine German railroads compared with the freight rate on German Coal on those lines. Diplomatic action has been advocated, but it is not believed that it will bring about the desired equalization. The only remedy would, therefore, be a measure of reprisal against German Coal on Belgian railroads, and much as we may detest it, such may chance to be resorted to in the end.

GERMANY.

(Borsenhalle).

HAMBURG, Nov. 27, 1875.—*Metals.*—Some encouragement has been held out to the Metal trade by the lowering of the discount rate at bank, and a good many people indulge in expectations of a brisk spring opening. It seems to us premature to venture upon the forecasting of the future, while so many doubtful elements surround us. The main difficulty which we contend with in our industrial pursuits has to be searched for in the existing high range of wages, not in proportion with the decline which values of all sorts have undergone during the past two years. Industrial pursuits cannot be carried on while wages remain as high as they are at present, especially in our larger cities, and trade cannot flourish while our establishments, large and small, are thus compelled to work at a downright loss. We may safely assert that a good many reforms of the kind will have to be gone through ere a lasting amelioration of existing evils can be seriously thought of. *Copper.*—Dealings are confined to filling pressing requirements, yet prices are sustained. English and Australian at Berlin still command 90 to 93 marks the 50 kilos. We are quiet here; lots recently arrived remain unsold. Swedish continues offering at 90 marks. We quote Drontheim, 94; Minnesota, 110, and Quincy, 98. *Tin.*—This metal had been for a long time neglected in Germany, and now begins to look up. At Berlin, Banca is quoted 96 to 96·50, and English, 93 to 93·50. *Lead* is weak in our markets. At 21·30 to 21·50 there is, however, no difficulty in the selling of it at Cologne, on the spot, and particularly to arrive. Berlin is firm for Tarnowitz, Hartz and Saxonian, at 25 to 26. Here large lots of old Lead have been placed at 20 marks. We quote German, 23·50 to 24; English Pig, 25 to 25·50, and Spanish, 26·10. *Spelter* remains in good request, and current rates are easily maintained. Berlin quotes 25 to 26; we are firm here at 25·50, without anything doing.

HOLLAND.

(Koch & Vherboom).

ROTTERDAM, Nov. 25, 1875.—*Metals.*—*Lead* on the spot is neglected; we quote Stolberg and San Andres, 13¾ guilders, less 3¼ per cent. discount for cash. *Tin* remains inactive, with greater readiness on the part of holders to realize. To-day, Banca delivered from the impending sale is offered at 51¼, and in order to move off any larger lots considerable concessions would have to be made. Billiton remains quiet, with 50¼ to 50¾ asked, without meeting with a purchaser. We apprehend that the sale of 23,000 slabs to come off 30th instant will go below the current figure, unless some unexpected favorable change in the disposition of consumers to operate should occur in the meantime. Nov. 30.—Stock to-day 97,577 slabs Banca and 4700 Billiton, against 144,684 and 3156 in 1874; deliveries in November, 7197 slabs Banca, against 8400 in 1874; since January 1, 116,233 Banca and 3153 Billiton, against 121,585 and 2967. Afloat from Banca, 5150 piculs, against 4200. Stock of Billiton, 19,927 slabs.

AUSTRALIA.

(South Australian Advertiser.)

ADELAIDE, Oct. 9, 1875.—*Copper.*—The fourteenth annual report of the Moonta Mines is an encouraging document. During the past six months the total yield of ore has been 10,714 tons, containing 20 per cent. of fine Copper, and the directors state that by an improved mode of dressing the ore there is no return of low percentage slimes for the half year. At the beginning of the half year the total quantity of ore on hand was 2953 tons, making the total supply

13,666 tons. Of this 10,287 tons have been disposed to the Wallaroo Company, and 3379 remain on hand.

EAST INDIES.

(Sanditands, Buttery & Co.)

PENANG, Oct. 23, 1875.—*Tin.*—Owing to an improvement in the London market a good demand set in, and considerable purchases for Europe and America were made at prices ranging from $22·50 to $23·35 per picul for unsmelted, and only with less favorable home advices the inquiry relaxed, and the metal gradually declined again to $23 to 22·75 per picul for unsmelted. The market closes firmer, however: purchases for China and India are reported at $22·90, and for Europe at $22·85 per picul. The steamship Fleurs Castle will call here on the way to New York toward the end of the month, and take Tin at £1. 10/. *Exchange.*—4/2 to 4/2¼.

CHINA.

(Arnhold, Karberg & Co.)

CANTON, Oct. 27, 1875.—*Metals.—Lead.*—Trifling sales have been effected at a concession of 5c. per picul; L. B. is in request at $7·55 per picul, but holders generally refuse to meet the market at this figure. W. B. has been sold at $7 60 per picul. *Tin.*—Common brands are quiet, but steady. Funghing chop neglected and quoted 25c. per picul lower. *Quicksilver.*—Prices of this article have again fluctuated to a considerable extent. During the early part of the past fortnight some sales have taken place at $103 to $105 per picul; but subsequently sellers succeeded in obtaining $110 to $111·50 per picul, while at the close no better offers than $103 to $104 are being made by buyers. We quote Lead, $7·45 to $7·60; Tin, $22 to $24·50, and Quicksilver, Spanish, $103 to $104; California, $105 to $106. *Exchange* on New York, 5 months' sight, 6 per cent. discount.

Our English Letter.

Review of the British Iron, Steel, Metal and Hardware Trades.

(From our Regular Correspondent.)

SHEFFIELD, ENG., NOV. 30, 1875.

"TO BE, OR NOT TO BE,

that is the question" which most affects our insular equanimity when we contemplate the curious and threatening state of affairs in the East. Mr. Disraeli's government a day or two since startled the country—and, it may be, a great part of the world—by the announcement that the shares of the Khedive in the Suez Canal had been purchased by Great Britain. The intelligence took everybody by surprise, although the news had the effect of promptly dissipating the uneasy rumors which had previously been current, and to which I alluded at some length last week. Everybody seems to be of opinion that the government has effected a fine and masterly *coup* by this purchase, seeing that the Khedive has 177,000 shares out of the 400,000 into which the capital of the canal is divided. Other 30,000 shares have been quietly bought on the Paris Bourse, it is said, so that perfidious Albion may be said to control the canal votes. The writer of the *Times'* city article appears to believe that this is only a first step toward altogether buying up the canal, which could be done for £13,000,000. The amount *now* to be paid to the Khedive is £4,000,000, upon which sum he is to pay five per cent. interest until the shares bear dividends, which will not be for some 13 years hence. The Viceroy of Egypt wanted money badly—the fact was not disguised—and as his shares were in the market the government have bought them, lest they should fall into the hands of some power hostile to British commercial interests. It is, further, stated that a financial commission is to be sent from this country to Egypt, in order to investigate the Khedive's affairs and advise him as to certain reforms he is said to have in contemplation. In Paris the news of this stroke of financial diplomacy is said to have created an immense sensation. The *Debats* newspaper of Sunday, 28th, contained a caustic article from the pen of John Lemoinne, in which he sarcastically remarks that "our neighbors possess a rare facility for turning their coats!" Other of the French journals take different views, but all agree that France must remain quiet. From Berlin it is telegraphed that the Germans are much impressed by this new attitude of Great Britain, but the official papers so far have not spoken in inspired tones. It is to be expected, however, that we shall hear a few remarks on the subject from Wilhelm Kœnig and Prinz Otto Von Bismarck, and it may be that the governing counselors of His Most, etc., etc., the Czar of Russia, will feel called upon to express their feelings with becoming emphasis. Francis Joseph is presumably out of the way, and nobody appears to consider the Sultan in the matter. We are all, however, rather anxiously awaiting whatever may be "behind the scenes," which may or may not be revealed at the special assembly of Parliament, which, it is rumored, is likely to be called for about December 14. One thing, to sum the matter up, is quite certain, and that is this: that the people of this country fully approve the *motive* which has led the government to buy the control of that canal, which gives easy access to India; that they will support the government, in case Russia *should* object, and that, generally speaking, on the Eastern question they are fired with the Tennysonian sentiment that

* * * * Better not be at all
Than not be noble,

and, I would add, warlike. In the meantime, and pending some official utterance upon the subject, trade is being prejudicially affected. Merchants are holding back orders, and are stopping shipments which had been ordered eastward. Traders are everywhere exercising caution—it being felt—in short, that we have never been in so critical a political situation since that memorable March day, in the year 1854, when the Aberdeen ministry declared war against Russia.

GILEAD A. SMITH & CO.

Last week a meeting in bankruptcy was held in London in the affairs of Gilead A. Smith, John D. Philips, Robert L. Burnett and Henry E. Smith, trading in 'Change alley, London, and at New York, United States, as Gilead A. Smith & Co. The unsecured debts were stated to be £185,000, with secured debts of over £600,000, the assets being £20,636. Messrs. G. A. Smith and J. D. Philips were allowed to pass, but the other bankrupts were said to be in New York on business, and the judge consequently ordered an explanation of their absence to be put on the court file.

COAL IN GERMANY.

The *Morning Post*, which has a soul ordinarily above mundane affairs of less importance than evening dress, condescends to the following details:

"The Chamber of Commerce at Bremen has addressed a circular to all German consuls abroad, calling attention to the superior qualities of German coal, which is now found to be fully qualified to compete with and supplant English coal in every respect. There is Westphalian coal, perfectly equal in heating power to the steam coal of South Wales, of Yorkshire and Northumberland; also, gas coal not a whit inferior to that of Newcastle; moreover, coke is now made in Westphalia as hard and easily transported as any in England. The Chamber of Commerce invites German consuls, as a matter of patriotism, to make inquiries at their several stations as to the particular species and quality of coal most in demand, and to report the result of their inquiries to Bremen. The Chamber will then endeavor to insure the shipment of such coal to the various places, and requests the consuls to promote the sale in order to encourage the exportation of German coal, which it is hoped may be developed to a profitable branch of commerce."

THE CUNARD STEAM FLEET.

This noble fleet of vessels now consists of 49 ships, with 14,457 nominal horse-power, and an aggregate of 90,506 gross tonnage. Of the total number, 24 vessels are in the Atlantic mail service, 12 on the Mediterranean and Havre line, 5 ply between Glasgow and Belfast, 3 between Liverpool and Glasgow, 3 between Halifax and Bermuda, and 2 between Glasgow and Derry. The money value of the Atlantic mail boats alone has been estimated by a competent authority at between three and four millions sterling; and it would probably not be an exaggeration to state that of the entire fleet at double the amount.

FAILURE IN SOUTH STAFFORDSHIRE.

Mr. Henry J. Marten, carrying on business at Wolverhampton as the Parkfield Iron Company, has filed a petition in bankruptcy, with liabilities amounting to over £50,000. His assets are of very limited value. Mr. Marten had been in the business about 22 years, but had been in difficulties some time—difficulties which came to this climax owing to the recent advance in coal prices.

SCOTCH PIG IRON.

The Glasgow market remained quietly firm during the whole of the week just ended at about 61/ to 61/9 for g. m. b. warrants. Makers' brands remained fairly steady, but it will be noticed that the week's shipments were only 10,879 tons as against 13,700 tons in the same period of 1874. The stock in Connal & Co.'s stores on Friday night was 66,294 tons, a decrease of 1441 tons for the week. There are 114 furnaces in blast now in various parts of Scotland, as compared with 120 at the same date last year. Ballast pig iron is 47/6 per ton alongside in Forth or Clyde. Freights have become higher, those to your ports being as follows: Glasgow and Ardrossan to New York, 5/; to Boston, 14/; Glasgow to New Orleans, 5/; Ardrossan to New Orleans, 6/; Glasgow or Ardrossan to Baltimore, 8/; to Philadelphia, 10/; and Glasgow to San Francisco, 27/6.

Writing from Glasgow on Friday evening, November 26, Messrs. James Watson & Co. said: "The price of Scotch pig iron warrants has been firm this week, business being done from 61/ to 61/10¼ cash, closing to-day at 61/9. Shipments last week were 10,879 tons against 17,700 tons in the corresponding week of 1874."

	No. 1.	No. 3.
G. M. B., at Glasgow	63/6	61/6
Gartsherrie, "	73/	64/6
Coltness, "	77/6	65/6
Summerlee, "	70/6	62/6
Langloan, "	73/6	63/6
Carnbroe, "	66/6	63/
Calder, at Port Dundas	74/	63/
Glengarnock, at Ardrossan	69/	63/6
Eglinton, "	63/6	62/6
Dalmellington, "	63/6	62/6
Shotts, at Leith	73/	65/6
Kinneil at Boness	64/6	61/6

Messrs. Wm. Colvin & Co., Glasgow, Nov. 30th, say: "There was a good business done in warrants during the latter part of last week, the price ranging from 61/6 to 62/1½ cash, and closing on Friday at 61/9. On Monday the opening price was 61/9, as high as 62/6 was paid, and the close was sellers at 62/3. To-day a good business has been done from 62/ cash and 62/3 one month up to 62/4½ cash and 62/7½ one month, closing with sellers at these prices, and buyers 1¼ per ton lower. There is not much change to report in makers' iron, but the tone is firm, and even in some departments of the malicable iron trade a more cheerful feeling may be discovered."

	Deliverable alongside. No. 1.	No. 3.
G. M. B., at Glasgow	63/6	62/
Gartsherrie "	73/	65/
Coltness, "	77/6	66/
Summerlee, "	70/	62/6
Langloan, "	73/	64/
Carnbroe, "	66/6	63/
Monkland "	64/	62/
Clyde "	64/6	62/6
Goven, at Broomielaw	64/	62/6
Calder, at Port Dundas	75/	64/
Glengarnock, at Ardrossan	69/	64/
Eglinton, "	63/6	62/6
Dalmellington, "	63/6	62/6
Carron, at Grangemouth	64/	..
Carron, " specially selected	67/6	..
Shotts, at Leith	73/6	65/
Kinneil, at Bo'ness	64/	61/
Bar Iron	£8. 0/ to £8. 10/	
Nail Rods	£9. 0/.	

SHIPMENTS.

	Tons.
Week ending Nov. 27, 1875	8,116
" Nov. 28, 1874	7,771
Increase	345
Total Increase for 1875	83,727

Messrs. John E. Swan & Brother's (limited) prices current, Glasgow, Nov. 26:

Glasgow Brands.	Furnaces B'wing. 114	Furnaces Out 30.	Furnaces Built. 154.	Prices. No. 1.	No. 3.	No. 4
Gartsherrie	13	3	16	72/6	65/	64/
Coltness	13	0	12	77/	65/	..
Summerlee	5	1	8	70/	62/	64/
Langloan	6	0	8	73/	63/	..
Govan	4	0	5	63	61/6	63/
Calder	3	1	7	*73/	64/	64/
Shotts { Bess'mer	2	0	2	80/	..	..
Shotts { Ordinary	3	1	4	72/6	65/	..
Carnbroe	4	2	6	65/	62/	63/6
Wishaw	2	0	3	..	..	..
Monkland	6	0	6	63	61/6	..
Chapelhall	3	0	3	67/6	..	..
Clyde	5	0	6	64	61/6	..
Quarter-Clyde	4	0	4	63	61/6	..

* f. o. b. Glasgow, 1/ per ton, extra.

Glasgow Warrants, 3-5 No. 1; 2-5 No. 3, g. m. b., 61/9.

WEST COAST BRANDS—*f. o. b. Ardrossan.*

Glengarnock		7	2	9	68/6	63/ 63/
Ardeer		4	1	5		
Eglinton	Brand's	6	2	8		
Lugar	Eglint'n	4	0	4	63/	62/ 62/6
Muirkirk		3	0	3		
Portland		3	3	6		
Dalmellington		6	2	8	63/	62/ 61/

EAST COAST BRANDS—*f. o. b. in the Forth.*

Kinneil		3	1	4	64/	61/ 60/
Almond		2	1	3	63/	61/ 60/
Carron	Selct'd	4	2	6	67/6	.. ..
Carron	Ordn'y				62/6	.. ..
Lochgelly		0	4	4	..	.. ..
Lumphinnans		0	2	2	..	.. ..
Bridgeness		0	2	2	..	.. ..

TRADES OF SHEFFIELD.

This week very little work is being done at any of the iron or steel works of the town and district owing to the winter fair holidays, which are the cause of stopping the works and collieries for several days. The suspension of operations will not be regretted by many of the manufacturers, inasmuch as it relieves them of several troublesome difficulties for the time being, and may, by some combinations of good fortune and slight accumulations of orders, enable a fresh start to be made under somewhat better auspices. This hopeful supposition is, however, a good deal militated against by the bad effects of the war rumors which have been current for a week or so past. It is not that any large number of business men believe with any firmness that war will really take place, but because a large number of persons have the impression that such a thing is very possible, and may come upon us suddenly, that the effect is prejudicial. Letters and other communications from London state that these rumors have worse effects there than elsewhere, a result which is a good deal to be regretted. The heavier branches of the iron trade here would not, in all probability, be injuriously affected by the outbreak of hostilities in the East, but the lighter industries would suffer severely. At the present time there are no departments of the local iron trade anything like so steadily and actively employed as the armor plate mills, forges and shops, which are producing a variety of plates and fort shields for our own and sundry foreign governments. At the Cyclops Works, Messrs. Charles Cammell and Company, Limited, a revolving turret of large size is being constructed for a fort in connection with the Dover defences. This turret is 37 ft. 2 in. in outside diameter and 32 ft. in diameter inside. In the rough it weighed considerably over 600 tons, but by drilling bolt holes and cutting port holes the weight has been reduced to about 400 tons. This great piece of ironwork is constructed of three separate cylinders of wrought iron, each cylinder being seven inches in thickness. Each of the cylinders is five inches apart from the other, the intervening space being intended to be filled up with teak or concrete. The same company are making a number of other plates, &c., for the South Coast defences, as well as for certain of the new German ironclads. They also have in hand the plates for our own ships, the Alexandra, Nelson, Temeraire, Northampton, &c. The Prince and Princess of Teck visited the Cyclops Works last week and saw the Bessemer process, the rolling of an armor plate, &c. In going through the file shops the Prince partly cut a file under the instructions of a workman, whom he has since presented with his portrait.

In pig iron the week's transactions have been on a limited scale at about 60/ to 61/ for a good foundry number, and 58/ or thereabouts for forge. Hematite pigs are in slow request at the following figures: Maryport, No. 3, 72/6; No. 4, 72/6; No. 5, mottled and white, 72/6; Bessemer, No. 1, 80/; No. 2, 77/6; and No. 3, 75/, all per ton; Millom No. 1, 80/; No. 2, 77/6; and No. 3, 75/; ordinary No. 3, 72/6; No. 4, 71/6; No. 5, 71/6; mottled, 80/; and white, 80/ per ton, with the usual allowances for prompt cash payments. There is no alteration whatever to record in merchant iron, which remains firm at late prices. A few brands of best bar iron are rather scarce, owing to the continuous run upon the limited production for steel converting purposes in this district. The cast steel trade itself does not improve, and does not appear likely to do so during the ensuing six months; the best and oldest established houses in this branch are doing less business at the present time than for very many years past. In one instance, at least, I am informed the workmen have had to submit to a reduction of their wages. A few American orders continue to be made up mostly in respect of shovel plates, best axe steel or best rolled sheets of 12 to 16 gauge for use in making clock springs. Specially rolled rod and shaped steel for tool making purposes is not selling so well now as it has been, but a few firms possessing special brands are fairly well supplied with orders for small lots. There is, intermittently, a good business in large railway springs, which of necessity have to be made from bar steel of the best quality. I am glad to hear that the yearly contract for all steel and steel articles required by one of the largest of our railway companies has again been taken by a local firm. In the hardware industries there is no news worthy of record. Most of the lighter trades are moderately well employed, with the exception of the file manufactories, and will probably remain so up to Christmas, after which matters will probably be in a worse condition.

A good deal of interest has been excited by the inauguration of a movement which has been set on foot for the purpose of uniting all the women employed in the various manufactories in one trade's union. A meeting has already been held, and it is stated that success is likely to attend the efforts of the promoters. There are thousands of women employed in the silver plating, cutlery and other trades.

On Monday afternoon a conference of ironworkers' delegates from the whole of Lancashire and Yorkshire, assembled at Parkgate, in order to discuss the present aspect of the strike at the Parkgate Works, which has now lasted ten weeks. Mr. Kane, secretary of the Ironworkers' Association, and delegates from Wigan, Warrington, Leeds, Normanton, Masborough, Sheffield, &c., were present. After a discussion of over three hours in duration, it was decided that the men ought not to go in again at the 9/6 per ton, but that a further discussion of the subject was advisable.

Mr. Edward Malet, C. E., Secretary of Legation at Rome, and Mr. Austin Lee, of the Commercial Department of the Foreign Office, have been at Sheffield for several days past making inquiries as to the probable effect of Italy not renewing the commercial treaty with Great Britain which expires in 1876. They visited a number of the various works, and have since gone to other large towns.

On Friday last the Glass Houghton Colliery shaft head gear caught fire with 73 men in the workings, where they were detained in great peril for fifteen hours, and were rescued just in time to prevent loss of life. Next day two men were accidentally killed at the same pit.

The coal trade continues to grow brisker, but the improvement is most noticeable in respect of house fire qualities. The coal owners of the Leeds district have raised best and seconds coal 1/ per ton, so that at the wharves in that town prices are now: Best, 19/7, and seconds, 17/11 per ton. At the Kilburn Colliery, Derbyshire, best is now 18/6; cobbles, 17/6; and slack, 13/6 per ton. The last-named must be a superior sort of slack to command 10/ per ton more than does ordinary slack in this immediate vicinity.

A not very formidable dispute has arisen at the establishment of George Wostenholm & Co., Limited, Washington Works, Wellington street, Sheffield, on a somewhat peculiar and old-fashioned custom of the cutlery trade. The spring knife cutlers are the parties concerned, and they are rebelling against a custom, which has been observed for half a century at these works, of compelling them to clean such knives as have become rusty in the warehouse. The cutlers say it is no fault of theirs, but rather of the finishers, and a few of them have, consequently, gone out on strike. Cutlery, generally, is in moderately good request.

ENGLAND AND FOREIGN COMPETITION.

A Mr. A. G. Dudley Ward writes to *Iron* as follows: "At a period when every description of trade is dull, and especially that one to which particularly your journal is devoted, it may be gratifying to some of your readers to know that really the iron trade on this side of the Atlantic is by no means so depressed as that transacted in the United States. I have been resident for upward of eight years in the States, and have lately made myself as practically conversant with the state of trade in Pittsburgh as I have always been with that of Sheffield. Now, on my return from America, I am assured on every hand that the iron business of this country has degenerated to a degree of almost hopelessness. This is not the case. I have visited Sheffield since my return. On application to Mr. Ellis, the indefatigable chairman of John Brown & Co. (limited), I had free access to those extensive works. I compared what I saw there with what I saw at Baldwin's Locomotive Works at Philadelphia, which once had the reputation of 'turning out' a complete locomotive daily. I was not shown over the works by Mr. Ellis: I was told simply I could go where I pleased, and I did this. So I did over other works, and the comparisons I drew were decidedly in favor of the opinion that Sheffield was better off than Pittsburgh. I resided in the iron and coal regions of the Lehigh Valley for some time, and can correctly estimate the amount of depression of those branches of industry—a natural consequence of the late American financial revulsion. The Pennsylvania Central, Philadelphia and Reading, Erie and Atlantic and Great Western railways, to say nothing of others of past years, were immense customers in this market. With the exception of the Philadelphia and Reading, hardly any of the other corporations spend a penny over here. The extraordinary failure in the 'iron trade' of an ambitious American firm was due simply to the death of a relative of the principal partner, that relative being the president of an important American railway. This failure brought down a whole army of industrious small firms in Sheffield, and the natural consequences were everyone remarked the iron trade of Sheffield is bad, and likely to be worse. (And I hope it will if its chief exponents trust every sham who turns up from the other side of the Atlantic.) Practically speaking, I am sure that very little of our trade has gone out of the country; and I am borne out in this conclusion by the very pertinent fact that foreign manufacturers, European and American, are accepting paper and bonds for their produce which would not see the sunshine in the city of London. My late experience of Birmingham, Wolverhampton and Middlesborough is identified with what I have stated of Sheffield. It is true, Belgium, France and Russia are all underselling us in the locomotive and rail trade; but then, so far as iron is concerned, are we to leave out that vast and unequal item—shipbuilding? It was only yesterday I saw with my own eyes the last part of 6000 employes wending their way from Laird's shipbuilding yards at Birkenhead. I looked upon these and remembered those employed at Hull, Newcastle and all those of the North of England. I saw in the Mersey a fleet of magnificent new vessels—that is to say, not two years old—and at Laird's all those magnificent docks of that eminent firm which line the river for half a mile filled with "jobs"—that is to say, jobs necessitating the most interesting process of being lengthened; H. M. S. the Orontes for one, a couple of those floating palaces belonging to the Allen Steamship Company, a Russian liner, vessels in the course of construction on the slips—all ample evidence of the activity of the iron shipbuilding business, and of course, as I have remarked before, a very important item in the iron trade. I do not pretend to go into the cost of production, although I am free to speak of the difference between the price of labor here and elsewhere; but I do say if any enterprising company be started, which I hope it never may, for the production of iron here—a company ready and willing to accept "bonds" and paper similar to that which has been so recklessly circulated among our iron friends—we will cease, certainly for a while, to hear the ridiculous reports which are current concerning this great branch of British industry."

SOUTH STAFFORDSHIRE AND BIRMINGHAM.

Some little disturbance has taken place in the South Staffordshire iron trade, owing to the failure of Mr. Marten—to which I have already referred—but it is not believed that there are many heavy local creditors. In pig iron no great number of transactions have taken place, and the mills, as well as forges, are doing a slacker business. Some of the sheet producers, on the contrary, are doing rather better, and have their order books pretty well filled with small favors, mostly on account of the local hardware manufacturers. Owing to the severe competition with Sheffield and the North of England, transactions in plates only refer to small quantities. Marked bars are steadily held at £10, with an extra 12/6 for Lord Dudley's, and common at £8 to £8. 10/. Traffic in iron wire, and articles made therefrom, is very much restricted by the successful competition of the French and Belgian makers, who are at present sending a good deal of wire even to this country. In the hardware industries there is a very respectable amount of employment, and prospects are said to be rather brighter, a state of things which is said to be especially true of the United States and Canadian markets. Prices of most sorts of nails have been advanced by 10 to 15 per cent., on account of increased wages to the work people.

SOUTH WALES.

Last week only 675 tons of iron were sent off from Cardiff, of which 450 went to Huelva, 141 to Smyrna, 50 to Palermo, and 34 to Oporto. Very few rail orders are in hand throughout the entire district, although current quotations are £6 to £6. 10/, such work as is being done being mainly on bars, which sell best out of the district. Many of the collieries are being closed, and the remainder are only working about half time. There is some little business being done in tinned bars and plates, but the output does not yet reach an imposing total.

THE METAL MARKET

opened dull and quiet on the Monday, and so continued on the following day, at £83. 10/ Straits Tin; Australian Tin, £82. 10/; Spelter, £25, and Lead, £22. On Wednesday two or three sales of Chili Bars took place at £81 to £81. 5/. Straits Tin, spot, was quoted at £83. and Australian, £82, Spelter being steady at £24. 15/ to £25, and Lead, English, £22. 2/6. On Thursday and Friday there was the same quietude, only a few lots of Straits Tin, for consumption, being done at £83. Quicksilver, however, advanced to £12.

Messrs. Von Daelszen & North's report says: "*Copper.*—The transactions in Chili Bars have been on a very moderate scale, comprising about 300 to 400 tons since our last, from £81 to £81. 10/. The latter is now the nearest quotation. There is no change in the position of Australian, and very little business is passing. Wallaroo £91, and Burra £89. 10/. English very quiet. *Tin* remains dull in tone, and there is little doing except for immediate consumption and exports. Straits has changed hands to a small extent from £83. 10/ to £83, and Australian from £82. 10 to £82. Nothing done worth recording in forward parcels. English dull of sale. Pending the Banca sale of the 30th instant, the Dutch market remains unchanged. Tin plates remain in fair demand, but there is no change in prices to report. *Lead* is if anything in better demand, and has advanced about 5/ per ton; good soft English Pig, £22. to £22. 5/. *Spelter* is without change in value; Silesian, £24. 15/ to £25. *Quicksilver* has further advanced 10/ per bottle; the importer holds for £11, and this price has been paid in several instances."

The *Mining Journal* remarks: "*Copper.*—There is but little change to report in the position of this metal during the week. The actual business continues to be very limited, and is likely to remain so till after the turn of the year. What little business in Chili bars has been done during the week has been at £81 to £81 10/, usual cash terms. English tough quoted £88; select, £89; strong sheets, £95; India sheets, 4 by 4, £93; yellow metal, 7¾ to 8¼; ore, 16/6 to 16/8½. *Lead.*—The firmness which has marked this metal of late has been fully maintained. Good soft English pig is quoted £22 to £22/5, and soft Spanish without silver £21/10. *Spelter.*—There is not much doing. Ordinary Silesian on the spot is quoted £24/15 to £25; English hard, £20. *Zinc.*—Foreign sheet zinc has realized £29. *Quicksilver.*—This metal was advanced during the week to £11. Sales were made early in the day at £10/15, but on late 'Change £12 was quoted. *Tin.*—The market has been quiet during the week, and prices have rather a downward tendency, but without exhibiting very much actual variation. Straits, £82/10; Australian, £82. *Tin Plates.*—The demand is very sluggish, but there is no variation in quotations."

Messrs. Berger Spence & Co.: "*Lead.*—The downward tendency which we reported in our last had had the effect of clearing the market of surplus stock, and as a natural consequence prices have assumed a stiffer tone. Dealers have, however, so far availed themselves of the recent fall that they are not likely to buy largely for some little time, and we may expect to see but a slight advance on present prices. *Copper.*—Transactions have been confined to the superior brands, quotations for which are firm. *Tin.*—There is a further improvement to report in the position of this metal, and rates have an upward tendency. *Spelter.*—Demand limited; prices maintained."

Latest Liverpool prices are:

Iron: f. o. b. in Liverpool, per ton.

	£	s.	d.	£	s.	d.
Merchant bar	7	17	6 @	8	5	0
Merchant bar, in Wales	7	7	6 @	7	15	0
Staffordshire	8	10	0 @	11	15	0
Hoop	9	15	0 @	10	15	0
Sheet	11	10	0 @	11	15	0
Nail rod	8	10	0 @	9	0	0
Bar, best crown	8	10	0 @	8	15	0
Boiler plates	11	0	0 @	12	0	

Tin Plates: f. o. b. in Liverpool, per box.

	£	s.	d.	£	s.	d.
Charcoal, I. C.	1	6	0 @	1	8	0
Coke, I. C.	1	2	6 @	1	4	0

Copper: Delivered in Liverpool, per ton.

	£	s.	d.	£	s.	d.
Bolt and Sheathing	97	0	0 @	0	0	0
Tile	90	0	0 @	0	0	0
Tough cake	90	0	0 @	0	0	0
Best selected	92	0	0 @	0	0	0

L. W. Pond Arrested.

A dispatch from Worcester, Mass., under date of the 11th inst., gives the following information:

About two months ago Lucius W. Pond disappeared from this city. He was a large manufacturer, a leader in the Methodist church, and active in public movements, especially those of a religious character. The last seen of him before his absence was on a Fall River boat bound for New York, where a long and thorough search was made for him by the police. It was supposed that he had been murdered for his money, but less complimentary theories were soon bruited. After his departure he was found to have forged to the amount of $100,000 by the use of ink-erasing acids, beside the immense indebtedness that he had piled up by promiscuous borrowing and the exchange of "accommodation paper." His endorsers found notes coming in on them of double the amount supposed to be in circulation, and which they had no recollection of signing. Certain of them were therefore examined with the microscope and tested with chemicals, proving beyond doubt that their face had been removed and rewritten, while the endorsements were genuine. The original notes were made payable at Mr. Pond's office, or without naming any particular bank. It thus happened that when they were paid they remained in his possession without any mark of cancellation, or anything to show that they were dead paper. It was then a tolerably easy matter to remove the writing on the face with acid, write in fresh dates and amounts, and add his own signature.

Pond has been traced and captured at San Francisco, being started east yesterday on requisition papers that had previously been forwarded. He is expected to reach Worcester on Friday next. He was found at San Francisco, just as he was about sailing for Australia. The forgeries which he committed were of the most dangerous description, impossible of detection under ordinary circumstances. They were perpetrated on his best friends, as well as on widows and orphans, who he knew were trusting him with their all. For four years he had been deceiving the bank, which has stood by him, contrary to its interests and its judgment, taking a false oath that he owned the requisite amount of stock to entitle him to a place as director, when it is now discovered that this stock was all the time out of his possession. The amount of his forgeries is enormous. Out of one lot of $30,000, but a single good note has been found. Out of another lot of over $40,000, scarcely a note has so far stood the test.

A Large Factory Burned at Bridgeport, Conn.

On the evening of Tuesday last the factory, machinery, etc., of the Wheeler & Wilson Sewing Machine Company, at Bridgeport, Conn., was destroyed, the loss being $500,000. The building in which the fire originated occupied the center of a quadrangle, bounded by East Washington avenue on the south, Pembroke street on the west, Barnum street on the north, and Brooks street on the east. The main building, fronting on East Washington avenue and the New York and New Haven Railroad, was 650 feet long, and three stories high. A building of the same length and two stories high faced on Barnum street, on Pembroke and Brooks streets. The buildings each were 250 feet long. The buildings occupied a whole block and covered about two acres. All were of brick, and being devoted to the manufacture and storage of sewing machine tables and cabinets, contained much combustible material. A strong northwest wind was blowing when the fire broke out, and the flames spread with great rapidity to both of the main buildings. In spite of the earnest efforts of the three steamers comprising the Bridgeport Fire Department, aided by the Wheeler & Wilson Sewing Machine Company, fire spread in half an hour to the oil and varnish department in the main building, and at this time the heat was intense. Masses of flame shot up, illuminating the sky for miles around, and making a light that was distinctly seen in New Haven, eighteen miles away. Some freight cars which stood on the track of the New York and New Haven Railroad, loaded with sewing machines, caught fire, but were hauled out of their exposed position by the engine of the passenger train which arrives here from New York at 6·52. Both the up and down trains were stopped by the conflagration.

A Copper Mill Destroyed.—The copper mill of the Ansonia Brass and Copper Company, at Ansonia, Conn., was destroyed by fire at six o'clock a. m., on the 11th instant. The loss is $20,000; the insurance $11,000. The origin of the fire is unknown.

Safes and Safe Deposit Structures.

Security is the wealth of wealth—the peace and strength of life. To attain safety from fire and thieves, mechanicians, chemists and engineers are respectively taxing their ingenuity and special skill, and the stages attained in the manufacture of iron safes and the construction of safe deposit buildings show the solution of many important practical problems.

After a devastating fire has baffled all attempts at fire resistance, the makers of iron safes are stimulated to devise something more secure than was before known. After a burglary of more than usual skill, another order of ingenuity is set to work to oppose more successfully the drill, the chisel, the crowbar and the sledge hammer, and the locksmiths are expected to do their own part of the work by producing fastenings that will defy picking and resist explosives.

Chemistry, indirectly, has done something to make plate-iron boxes and strong rooms thief-resisting, but in making such receptacles fire-proof many discoveries of scientific chemists have been directly utilized in a remarkable degree. A fire proof composition is used as linin for some safes, while in others the heat of any conflagration to which the safe may be exposed produces chemical changes of a fire-resisting character. Frequently the case is made hollow or double, and the protective filling thrust in between the sides. Patentees have selected a large number of substances from which to form this fire-proof filling—sand, sawdust, burnt clay, powdered charcoal, dust, fragments of stone, baked wood ashes, small gravel, bone dust, ground alum, gypsum and cement; all are adopted by different inventors. In one form, a specially chosen liquid is placed in some part of the interior of the safe; an external fire, greatly heating the iron, bursts the vessels containing the liquid, and the latter, saturating the powdered substance used as filling around the interior, renders it fire resisting in a high degree. Many inventors have turned their attention to the power of developing a vapor in the double jacket of the safe by the effect of external heat—a vapor that will retard the intense heating of the interior space where the valuables are placed. Steam is well known to possess this dampening quality, and some chemical salts and liquids also possess it in a still greater degree.

A certain English safe, made for a goldsmith, has walls of concrete, as well as of slab iron, and a canal of water within the outer covering. If any attempt be made to pierce the latter with a drill, an electric apparatus is set in action, which keeps a small bell ringing—effectually disturbing the quietude of a burglar. The Messrs. Milner, of London, have constructed safes or magazines for gun powder, which have preserved the contents intact, even when exposed to the fiercest flames ever known to fire brigades. The English government caused experiments to be made on these safes in the open marshes near Woolwich. The jacket of each safe contained alum and sawdust—alum having the property of liquefying when exposed to a high temperature. When thus liquefied, the sawdust is saturated, vapor arises, and is admitted into the interior space through small apertures, thoroughly wetting and cooling the contents, and thus preserving them. At the experiments in question, Maj. Magendie, of the Royal Artillery, put into each of the safes several canisters of cartridge charge. After six hours' exposure to intense heat—so intense as, in several places, to burn through an exterior covering of iron half an inch in thickness—the safes were allowed to cool. When opened, it was found that several sticks of alloy, capable of sustaining temperatures varying from 340° to 600° F., were not melted; a registering thermometer had not risen above 210° F.; the exterior of the canisters was quite wet with steam, and the gunpowder contained in them was uninjured.

There has been nearly an equal contest between the ability to force open a safe and the ability to effect such entrance. In 1865, says *Chamber's Journal*, from which we condense, the shop of a watchmaker and jeweler in Cornhill was plundered one night by burglars, notwithstanding the fact that most of the valuables had been placed in an iron safe of great strength. Subsequent investigations showed that the elaborate lock, made by one of the most distinguished makers, had not been tampered with, but the iron door of the safe had been wrenched open by a peculiar application of chisels and crowbar. A civil engineer, writing to the public journals, explained how this could be done. The safe maker denied its possibility; but the chief burglar, who was captured, and afterward made a confession, stated that he had employed the identical plan described by the engineer. Bankers, goldsmiths, and other owners of property small in size but great in value, were rendered uneasy by these revelations, for they found that, although locks might be made invulnerable to pickers, safes were not proof against forcing. Thereupon the safe makers set to work to produce safes that could not be forced open by any probable employment of chisels and crowbars.

Two exhibitors in Paris in 1867, an American and an Englishman, challenged each other. Large sums of money were deposited and judges and umpires chosen. The American, aided by three men, was to try to force open the best safe made by the Englishman, while the latter, with an equal number of men, was to try conclusions with the American's best safe. The American brought three skillful German workmen; the Englishman, three strong, but not specially skilled, men. The former had a large store of beautiful tools; the latter, a smaller store of rougher tools; but a debate settled that no side had an unfair advantage over the other. The Germans set to work upon the English safe. They tried the lock, but failed to open it; they endeavored to drill a hole through the door, but the layers of steel with which it was intersected baffled them; they also tried wedges at the edges of the door, but could not drive them in. Frustrated in the front of the safe, they turned their attention to one side, which was composed of four skins of tough metal bolted together. These they burst asunder, one after another, by applying chisels to the dovetailed joints, dealing heavy blows upon them, and loosening bolt after bolt. After four hours of heavy work, they succeeded in making an opening large enough for the abstraction of a sealed packet, which had purposely been placed by the maker on a shelf within. If they had made no attempt on the door, they would have saved an hour; if the packet had been placed in the drawer instead of on the shelf, their work would have been prolonged; but, as matters stood, they broke open the stronghold in four hours.

Meanwhile the Englishmen were trying their skill on the American safe, which was composed of a burglar-proof safe enclosed in one that was fire-proof. Half an hour was consumed in opening the outer one, and then the inner one was seen—much stronger in build, and difficult to get at. Nevertheless, the inner safe was broken into in about four and a quarter hours. The victory was to the American, with about a quarter of an hour to spare.

Without further details of strong rooms and safes, we proceed to describe a structure just finished, which is a perfect magazine of such defences—a stronghold full of strongholds—defying alike fire, water, gunpowder and burglars. The building constructed for this treasure deposit purpose is in the very centre of London, and stands upon ground purchased at a price nearly equivalent to $5,000,000 per acre. Facing the western front of the Mansion House on one side, and close to the Poultry, Bucklersbury and Walbrook, it is just in the midst of those establishments which require strong rooms or receptacles for the safe custody of monetary and commercial documents, precious metals and jewels. In the United States the original French plan being improved upon, Mr. Graves, a lately deceased Member of Parliament from Liverpool, traveled through this country in the interest of the new safe deposit company, and Mr. Gray, the managing director, has taken advantage of the very full information thus obtained. A professor of engineering and one of the Royal Engineers assisted in establishing the conditions necessary for fire-proof and burglar-proof construction. It is, we believe, quite correct to say that there is more work below ground than above in the costly building here alluded to; at any rate, the excavation made was of vast depth, and the honeycomb of chambers that fills it has been the result of more thought and labor than the above-ground structure. This subterranean portion seems to realize the end aimed at—a fortress to defy all assailants. The building has three fronts, and is entirely isolated, no other structure being within many yards of it. The core of the underground citadel, or fortress, is about 70 by 32 feet and 36 feet deep. It has passages all around it, vaults underneath it, and passages over it, insomuch that every part can be examined by the armed watchmen who will patrol the place day and night. The side walls of the citadel are six feet thick, and built of the hardest bricks that can be made. They are backed by a mass of concrete almost as thick, and lined with armor plates that would suffice for any of the best iron-clad frigates. One can hardly imagine any process of surreptitious drilling which would penetrate 12 or 13 feet of such wall; nor is it easy to see how fire could work much destruction, since there is scarcely any wood-work about the whole place. The doors by which the citadel and its four subterranean floors are entered were a source of anxious deliberation with the architect. As a rope or chain is no stronger than its weakest part or link, so a strong room is no stronger than its weakest part, which is the door, and the lock is no stronger than the door. A plan was formed for a series of iron doors to work upon hinges, but it was found that their manufacture would occupy a longer time than was convenient either to the company or to the builders. The architect thereupon resolved to dispense alike with hinges, locks and bolts, so far as the doors were concerned. Each door is a solid mass of the toughest rolled iron, nearly twelve inches in thickness; they slide, instead of turning on hinges, and their enormous weight renders locks and bolts unnecessary. A simple agency (we believe hydraulic) suffices to open these doors at the commencement of each day's business, and to close them when the busy hours are over. For the various stories, floors, or flats of the citadel, thirty-two of these doors are required, each of which weighs four tons. The iron is of the hardest kind known in the present state of metallurgy. In order to test what a burglar might or might not accomplish, a skilled workman was employed to do his best in drilling one of these formidable slabs, and in fourteen hours he was only able to penetrate one inch of iron, after breaking or blunting eighty-six drilling tools.

If any riot or tumultuous attack should occur, access down to the citadel would be no easy matter, seeing that the roof is formed of bomb-proof semi-circular arches; and even the operation of mining has been provided against, for the whole citadel is surrounded by water, which would frustrate, if not drown, any invaders. Its interior space is arranged in four floors or stories—the two upper floors being reserved for safes of small or moderate size, of which more than 10,000 are provided. These are let to the public at rentals varying from 50 to £30 each per annum, according to size and other circumstances. They vary in front from a few inches square to two feet square, but all are alike twenty inches deep from front to back, and all are immovably fixed. Each safe has a lock differing from every other lock in the place, and whenever a new renter takes possession of a safe a new lock is put upon it, or an alteration made in the interior of the mechanism of the old one. The renters can obtain easy access to their safes during business hours, and small compartments or recesses are provided to afford facilities for examining securities, cutting off coupons, etc. The two lower floors are appropriated to plate chests, or bulky boxes, which do not need to be often disturbed or opened, and to valuables placed in the immediate care of the company. A special tariff is charged for the latter, since the company is responsible for them.

Although rather late about it, other cities of England are beginning to appreciate the importance to them of safe deposits, and it is now announced that Manchester is about commencing the construction of one of them.—*American Exchange and Review.*

The Outlawry in the Anthracite District.

The Philadelphia *Ledger* has the following sensible article on the Molly Maguire outrages:

Nothing but a belief that the law in the coal mining counties is powerless to punish the classes of outrages peculiar to those regions could lead to the perpetration of such brutal murders as those announced by telegraph from Schuylkill county last week. We read of "lynchings" and "kukluxism" and "vigilance committees" in the far West and Southwest as indicating a sort of semi-barbarious condition of society; and we felicitate ourselves that no such things can happen in the highly civilized commonwealths of the East. Yet here we have the same thing in these Schuylkill county murders and in a lamentable catalogue of outrages of every imaginable description within the last half dozen years. It is in dispute whether the recent murders in Mrs. O'Donnell's house were "Molly Maguire" assassinations or the execution of the murderous decrees of some irresponsible "vigilance committee" appointed to "vindicate the law." It is admitted, however, that they must be one or other of these two; so that we have close at home in Pennsylvania either "lynch law" by a committee of "vigilants," or the equivalent of "kuklux" murders by a band of masked men. Surely this condition of affairs in the coal mining counties demands more effective and decisive attention than has yet been given to the subject. It is beyond all dispute that for years past there have been bands of men in the coal regions thoroughly organized for the purpose of carrying on a reign of terrorism, and that they have committed many outrages against person and property, beating, wounding, maiming, burning, destroying and killing in the execution of their villianous purpose. It is equally beyond dispute that nearly all attempts made to capture and punish the perpetrators of such outrages have failed—the captures and convictions being pitiably few in comparison with the number of such crimes. It is visible, too, that the dread of these masked murderers, who do their work in lonely places, or under cover of the darkness of night, has, to a considerable degree, paralyzed the ordinary course of justice, the friends and neighbors of the dead fearing a similar fate if they appear as prosecutors or witnesses, or take part in the trial as jurors. Every one who has traveled much in the coal regions, and has put himself in the way of getting trustworthy information of the real condition of affairs, has found instances of the kind above referred to. Long ago the question arose: How long is this condition of affairs to be permitted to last; how long are the inhabitants of the coal mining counties to be ruled and outraged and ruined by a reign of absolute terrorism? Now it comes up again, and it demands an answer from the State authorities and from the people of the rest of the State. The coal mining counties of the commonwealth are too important, the population depending upon regular and orderly government is too great, and the interests and industries they represent are too large and controlling to allow that they shall be governed either by "Mollie Maguires" or "vigilants," or any other organized bands of lawless men. The mining of coal has hazards enough to both the operators and their employers without adding to them the perils of lawlessness. The working miner or laborer who has been exposed during the whole of his working hours to the innumerable risks to his limbs and life that are inseparable from his vocation, should, at least, be free in his home from the bludgeon or the bullet of the ruffian who seeks to control his action. So of the "boss" and the superintendent. The mine owner or lessee, whose invested capital is subjected to unusual hazards that come from the very nature of the business, should be at least free from those which come from the torch of the incendiary and the axe of the masked destructive. A coal breaker, with its machinery, is of peculiarly combustible character; the breaker and apparatus, fully equipped for work, will cost nearly $100,000. Yet a band of these marauding ruffians with a box of matches may bring it all to destruction in five minutes' time. The pumping machinery of a mine that has cost $50,000 to open, and without which the mine may be drowned out and ruined, can be utterly destroyed in a few minutes by a few blows from an axe. These are some—and only some—of the perils that have been superadded to the ordinary but very great risks incidental to coal mining. In the interests of the miners and laborers and their families, in the interests of the coal owners and their property, and for the credit and honor of the Commonwealth, some decisive and efficacious steps are indispensable for vindicating the supremacy of the law, and making incendiarism, outrage and murder as certain of punishment as they are in other parts of the State.

The Catastrophe at Swarthe-Main Colliery.

Until we have further particulars of the dreadful explosion at Swarthe-Main Colliery, by which 130 or more souls were launched into eternity, many of them in the flash of a moment, it will be difficult to arrive at the true cause of so direful a calamity. It is said that the works extend for many miles, that they are worked with safety lamps under rigid discipline, and were considered safe. The explosion was caused, it is reported, by "careless blasting operations." To consider a colliery safe when the lives of hundreds of workmen were endangered by a blasting operation, however carelessly made, was a terrible mistake, reflecting an awful responsibility upon the proprietors. Could such an accident possibly occur by a simple blast, it would be positive proof that the mines were unsafe, that the lives of the workmen were constantly exposed to sudden and terrible death, and would, under the working of the mines by the owners, be a criminal proceeding; and the same may be said if the explosion was caused by an uncovered safety lamp. Explosions of fire damp are of frequent occurrence in the mines of this country, caused by the carelessness of the miners, resulting sometimes in loss of life, but they are generally circumscribed to a small locality of the works, and do not result in such awful consequences as the affair at Swarthe-Main. Such an effect would be impossible in a mine properly ventilated. The volume of gas required to produce such a tremendous explosion should never be allowed to accumulate. In the present instance the accident may have been caused by the imperfect ventilation of the mines, or by a blast near abandoned workings containing a reservoir of inflammable gas, to fire which would produce the tremendous explosion of a magazine. The great depth and the extended range of the workings of some of the mines in England make them difficult to ventilate properly, and to this fact may be ascribed many of the fearful accidents we are so often called upon to chronicle. Just 12 years ago in the Edmunds-Main Colliery, adjoining the mine where this last catastrophe occurred, 300 persons perished by a mining casualty. If any of the coal mines in England cannot be rendered secure, but are to be slaughter houses and sepulchres to the working men, the sooner they are abandoned the better for the sake of humanity.

In connection with the account of this dreadful calamity, the following suggestive paragraph sent to the Sheffield papers by Mr. W. F. Cooper, of the Meteorological Society, a few days before the accident, will be found suggestive:

THE WEATHER.—WARNING TO COLLIERS.—Since writing last week great and rapid changes of atmospheric pressure have taken place. On one occasion a difference of more than 1 inch in the barometer occurred in 24 hours, causing a difference in pressure of more than 50 pounds (at the temperature) upon every square yard of roof and face. The present is a most dangerous period for coal miners, and underground viewers must continue to exercise the greatest care, as the weather still looks wild and broken. The present month has witnessed most rapid changes in pressure, a succession of cyclones having passed over England, mostly traveling from southwest to northeast, and at present there is but little prospect of a definite change taking place. All next week the safety of roofs must be well looked to. The barometer was yesterday morning very low, and as temperature is now abnormally high, ventilation must be kept up. No lasting improvement in the weather can take place while the thermometers are so high and the air so nearly saturated. Look well for gas in places where it has not been previously found; it will be likely to prove abundant in places the least expected. Vigilance and careful inspection must by no means be delayed, should a fine day occur (a not unlikely event), as such a change will not be permanent, and the gas will still remain as the result of unusual expansions and diminished pressure. Do not permit a naked light under any pretence, and see that lamps are in good order and not tampered with. The safety of the mine and the lives of the miners may depend upon the carelessness of one man, and remember that frequent oscillations, as at present, are even more productive of gas than a permanently moderate low pressure.

The Channel Submarine Tubular Bridge.

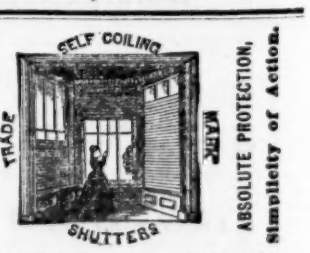
The London *Mining Journal*, in an article of some length, has been setting forth the advantages of a tubular submarine bridge instead of a tunnel:

Peter W. Barlow, F. R. S., who was the author of the Tower Subway project in connection with which he has actually made a long tunnel under the Thames from Tower Hill to Horselydown, without letting in, as expected, a drop of the water of the Thames, now puts forward a suggestion for a submarine tubular bridge. The proposition is worthy of consideration. Mr. Barlow believes tunnelling under the sea to be a mistake. The submerged tube has the immense advantage over all the tunnelling projects that the construction of 50 or more sections of the tube can be going on simultaneously, whilst but two pairs of men could work at the same time in the tunnel; and it is this that renders the completion of the tube within a year possible.

Mr. Barlow states that his attention has been recently called to the subject of completing railway communication under the sea, from having had to report upon the practicability of such a connection at the city of Rio de Janeiro. The question of cost is of the utmost importance. In all calculations of expenditure and returns which have hitherto been made, it has been assumed that the whole of the increased traffic would go by that route, although the difference in time to any Continental city would only be shortened by one hour, and that at the expense of half an hour's sojourn in an atmosphere so unwholesome as to be likely to have a most prejudicial effect upon the health. It is, of course, well known that greater lengths of airway than 20 or 30 miles are kept fairly ventilated in many of the larger collieries, but when the airway is enlarged from that of a horse level to that of a railway tunnel, the case is widely different, especially as the augmentation of the number of shafts would be altogether impracticable.

By the mode of construction which Mr. Barlow proposes, if his views be correct, two substantial and durable tunnels may be laid down for much less than any of the previous estimates, and within 12 months from the time the contract is signed. The plan proposed is to make the tube of elastic iron, or steel plates riveted together, surrounded and protected by 2 ft. 3 in. of brickwork (which, as the required deflection is but ¼ in. in 100 ft. could be conveniently used) laid in asphalt, and beyond this by 6 in. timber planking, well caulked and secured by rings of copper, or by a copper cylinder. Such a tube, he remarks, would float in the water, and would require some further loading to cause it to sink and lie on the bottom. Thus, it might be constructed at shipbuilders' yards in lengths of about 300 ft., and towed to the proposed line of railway. These lengths may be joined together by a floating iron cofferdam or dry dock. The whole tunnel may be laid in a few weeks when the requisite lengths are complete. The materials can be obtained, with Continental assistance, in one year. He has assumed one year as the time necessary to complete this work. He points out that the tunnel, being constructed of steel, is so elastic that the portion completed may be loaded and laid on the bottom of the sea, while the upper part is being fitted together on the surface of the sea, but it is not necessary that it should be laid on the bottom of the sea, as it may be suspended and anchored out of reach of shipping at 25 ft. below the water, in which case the deflection of the tube will be a matter of still less difficulty. When the tube is deflected from 70 ft. below the high water to the surface level of the sea, the extension produced by the curve is 1·3000th of the length, and the weight required in the tube (if of wrought iron) on the bottom and on the end on the level of the sea to produce the deflection is only 43½ tons, the strain not exceeding three tons per inch. If a more elastic metal than wrought iron is used, the weight required for bending will, of course, be less, but there are no direct experiments except as to wrought iron from which to estimate. The dimensions and mode of laying need not be referred to; they would readily be made to suit the circumstances of the case, and would present no insuperable difficulty. The sand and shingle of the Channel bed constantly moving from west to east could, by laying the tube upon the bottom, be to a great extent utilized to neutralize the forces to which the tube would be exposed. Were the tube laid fairly upon the bottom, and carefully stayed on the eastern side only with buttresses, the structure would gradually increase in solidity; the sand and shingle coming from the west would rapidly pack against the tube, and forming along its entire length a bank, with what may be termed an ogee surface, would thenceforth be a protection to the tube by aiding all further arrivals of shingle, etc., to ride over it without damaging it.

As compared with a masonry tunnel the tubes proposed by Mr. Barlow have undoubted advantages, as will readily be understood from the briefest considerations of the four leading recommendations of the tubular system to which he alludes—as compared with a masonry tunnel the depth below high water will be reduced one-half, with a corresponding improvement in gradient; the length of the tunnel will be reduced, the time of execution will be reduced probably to one-tenth, and the cost will be importantly reduced. Mr. Barlow has said enough to show that the difficulties of laying a pair of tubes across the channel are not insuperable, and the tubular system is certainly more likely than any other system of tunneling to prove commercially successful.



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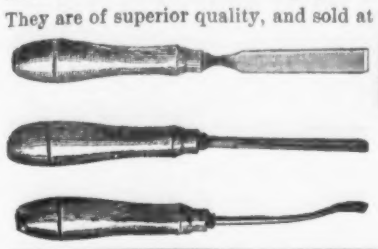

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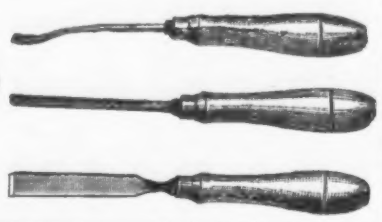

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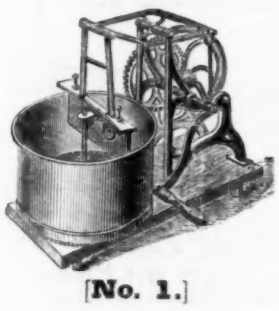

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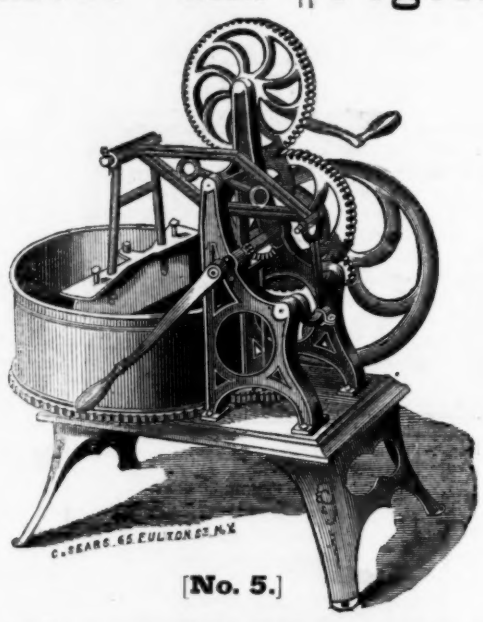

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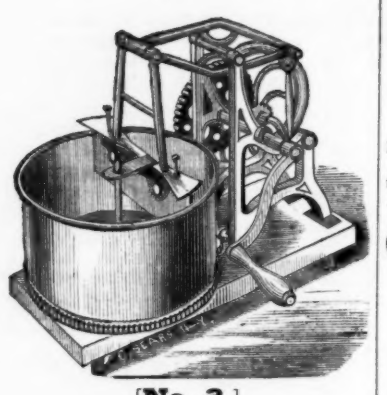

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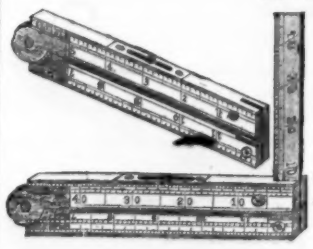

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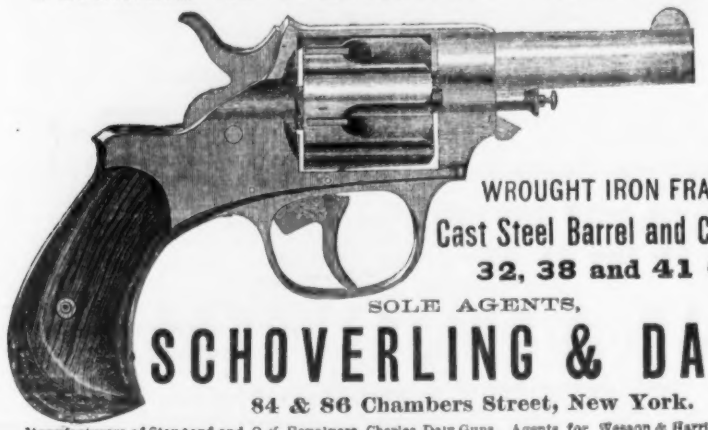

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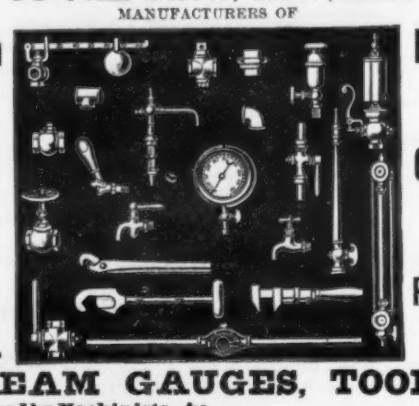

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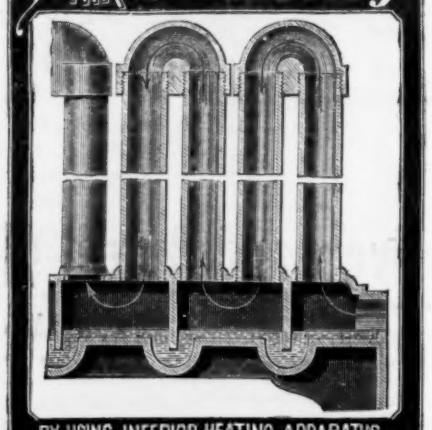

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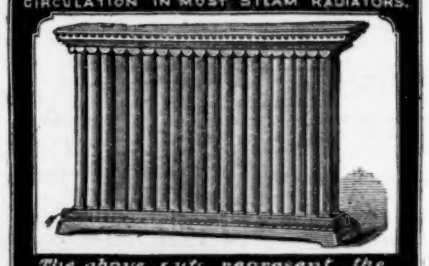

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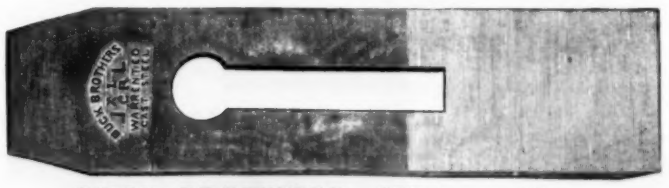

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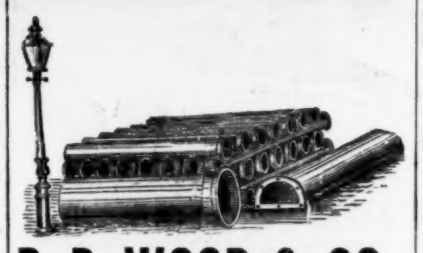

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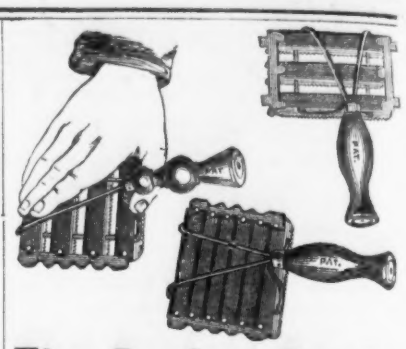

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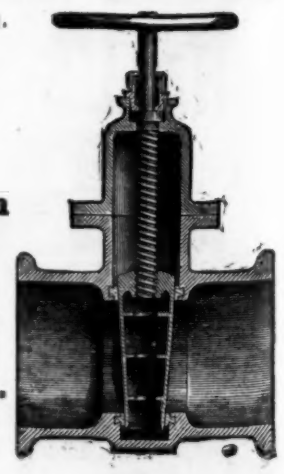

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Purves A. & Son, cor. South and Penn, Phila.....20
Quincy J. W., 96 William, N. Y.....2
Sturges Frank & Co., 72, 74 & 76 Lake, Chicago.....3
Thomson A. A. & Co., 213 and 215 Water, N. Y.....2
Van Wart & McCoy, 134 and 136 Duane N. Y.....2

Metallurgists.
Britton J. Bidgett 339 Walnut, Phila.....6
Hart Edward, Easton, Pa.....6
Maynard & Van Rensselaer, 25½ Broadway, N. Y.....6
School of Mines, E. 49th, N. Y.....6
Wallace & Humphrey, 113 Walnut, Phila.....6

Metal Roofing.
Hickcox Mfg. Co., 280 Pearl N. Y.....4

Meat Chopping Machinery.
Murray Iron Works, Burlington, Iowa.....13

Miners' Candles. *Makers of*
James Boyd's Sons, 10 and 12 Franklin, N. Y.....39

Mining Spikes
Roseberry Geo. D., Pottsville, Pa.....4

Molders' Tools.
Carter H. 290 Pearl, N. Y.....10

Molding Machines, *Makers of.*
P. & F. Corbin, 87 Chambers, N. Y.....36
Hammer T. F., Branford, Conn.....36

Mouse Traps, Catchemalive, *Makers of.*
Dietz R. E., 54 and 56 Fulton, N. Y.....40

Nails.
Schoenberger & Co., Pittsburgh, Pa.....4

Nail Pullers.
Maltby, Curtiss & Co., 34 Reade, N. Y.....34

Nickel Platers.
Colt A. T., 47 Beekman, N. Y.....27
Continental Nickel Plating Works, 47 Ann, N. Y....27
Hartman John, 37½ N. Seventh, Philadelphia.....2
New York Nickel Plating Co., 153 West 25th, N. Y....37
Owen S. S. & Co., 121 E. 13, N. Y.....27
Roehrig, Fred Wm., 417 Center, N. Y.....27
Wilder & Co., 114 Fulton, N. Y.....27

Norway Shapes, *Boilers of.*
Rowland Wm. & Harvey, Frankford, Phila.....40

Nute Broker.
Gallaudet P. W. 3 and 5 Wall, N. Y.....8

Nuts, Bolts, etc., *Makers of.*
American Bolt Co., 210 Lawrence, Lowell, Mass.....13
Carpenter David & Sons 404 Water N. Y.....1
Clark Bros. & Co., Millsdale, Conn.....12
Fuller, Lord & Co., 139 Greenwich, N. Y.....4
Haskell W. H. & Co., Pawtucket, R. I.....13
Hoopes & Townsend, 1230 Buttonwood, Phila.....12
Lewis, Oliver & Phillips, Pittsburgh, Pa.....13
New Haven Nut Co., Westville, Ct.....10
Old Colony Rivet Works, 116 Chambers, N. Y.....12
Roseberry Geo. D., Pottsville, Pa.....4
Russell, Birdsall & Ward, Port Chester, N. Y.....40
Shelton Co., Birmingham, Conn.....34
Sternbergen J. H., Reading, Pa.....13
Union Nut Co., 78 Beekman N. Y.....4

Oil Lubricating. *Makers of*
Lester Oil Co., 163 Water, N. Y.....37

Oil Stones. *Makers of.*
Boyd & Chase, 107th street and 1st avenue, N. Y.....37

Old Iron, etc.
Greer H. L. & Co., 108 Walnut, Philadelphia.....5

Ore Crushers.
Blake Crusher Co., New Haven Ct.....38

Paints and Oils, *Dealers in.*
Devoe F. W. & Co., 117 Fulton, N. Y.....
Empire Iron Clad Paint Co., 20 West B'way, N. Y...16

Patent Solicitors.
A. V. Briesen, 258 Broadway, N. Y.....20
Burke & Fraser, 37 Park Row, N. Y.....28
Cox & Cox, 229 Broadway, N. Y.....28
Howson & Son, Phila. and Washington, D. C.....28
Munn & Co., *Scientific American* 37 Park Row N. Y. 36
Nye Francis C., 13 Murray, N. Y.....28
Simonds W. E., Hartford, Ct.....2
Spencer A. H., 28 State Boston, Mass.....28
Stetson T. D., 23 Murray, N. Y.....28

Picture Nails, etc., *Manufacturers of.*
Richards T. C. & Co., 47 Murray, N. Y.....3

Pipes, Fittings, etc., *Makers of.*
Eaton, Cole & Burnham Co., 58 John, N. Y.....26
Meyer Henry C. & Co., 48 Cliff, N. Y.....40
McNab & Harlin Mfg. Co., 56 John, N. Y.....26
Pancoast & Maule, 227 Pear, Phila.....26

Pipe, Water and Gas. *Makers of.*
Barr Edward, 78 John, N. Y.....26
Leighton Bridge and Iron Works, Rochester, N. Y. 18
McNeal John & Sons, Burlington, N. J.....6
National Tube Works Co., 78 William, N. Y.....26
Warren Foundry & Mach. Co., Phillipsburg, N. J....6
Wood R. D. & Co., 400 Chesnut, Phila.....26

Piston Packing.
Canfield John & Co., 1321 Fairmount Ave., Phila. ..26

Plane Irons, *Manufacturer of*
Buck Bros., Millbury, Mass.....26
Mack & Co., Rochester, N. Y.....25
Middletown Tool Co., 18 & 20 Cliff, N. Y.....6

Planes, *Manufacturers of.*
Greenfield Tool Co., Greenfield, Mass.....16
Mack & Co., Rochester, N. Y.....25
Stanley Rule & Level Co., 35 Chambers, N. Y.....25

Plated Ware
Derby Silver Co., Derby, Ct.....40
Hall, Elton & Co., 75 Chambers, N. Y.....11
Rogers & Bros., 204 Broadway, N. Y.....
Reed & Barton, 2 Maiden Lane, N. Y.....33

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South Bend Iron Works, South Bend, Ind.....16

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Joseph Dixon Crucible Co., Jersey City, N. J.....40

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Baltimore Bell and Brass Works, 53 and 55 Holliday, Baltimore, Md.....12
Everhart Jas. M., Scranton, Pa.....40
Redfield, Bowen & Walworth Co., Chicago, Ill.....40
Carr Wm. S. & Co. 106 Centre, N. Y.....26

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Forsaith S. C. & Co. Manchester, N. H.....39

Portable Tables, *Makers of*
Mairs John G., Troy, N. Y.....40

Presses, Power. *Makers of.*
Boomer & Boschert Press Co., Syracuse, N. Y., and 26 Beekman, N. Y.....
The Stiles & Parker Press Co., Middletown, Ct.....36
Peck Milo, New Haven, Conn.....40

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Wild R. W., 20 Cortlandt, N. Y.....33
Sturtevant B. F., 72 Sudbury, Boston.....36

Pumps, *Makers of.*
Clayton Jas., 11 Water, Brooklyn, N. Y.....18
Douglas W. & B., Middletown, Conn.....7
Rumsey & Co., Seneca Falls, N. Y.....7
Union Mfg. Co., 99 Chambers, N. Y.....7

Pyrometers.
Brown Edward, 311 Walnut, Phila.....

Railroad and Mining Tools.
Metcalf, Paul & Co., Pittsburgh, Pa.....37

Railroad Supplies.
Duyckinck W. C., 50 and 52 John, N. Y.....8
Jackson & Tyler Baltimore, Md.....37
Rogers H. A., 19 John, N. Y.....25

Rails, Iron or Steel, *Makers of.*
Atkins Bros., Pottsville, Pa.....6
Cambria Iron Co., Johnstown, Pa.....5
Cleveland Rolling Mill Co., Cleveland, O.....6
Griswold John A. & Co., Troy, N. Y.....33
Lackawanna Iron and Coal Co., Scranton, Pa.....5
Milwaukee Iron Co., Milwaukee, Wis.....6

Razor Strops, *Makers of.*
B. F. Badger, Charlestown, Mass.....36

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Lesley Alex. M., 246 W. 23d st., N. Y.....28

Rivets.
Old Colony Rivet Works 34 Warren, N. Y.....12
Timme's Son Peter, 281 North 6th, Brooklyn, E. D...4

Road Scrapers &c., *Makers of.*
Revolving Scraper Co., Columbus, O.....

Rolling Mill Machinery, etc., *Manufacturers of.*
Moore James, Cor 16th and Buttonwood, Phila.....36

Rules. *Manufacturers of.*
Stanley Rule and Level Co., 35 Chambers St.....25
Stephens & Co., Riverton, Ct.....25

Saddlery Hardware, *Makers of*
Sargeant Mfg. Co., Newark, N. J.....12

Sad Irons. *Makers of*
Brooklyn Sad Iron Co., Brooklyn, E. D., N. Y.....33

Safe Deposit Co.
Penna. Warehousing & Safe Deposit Co., Front and Lombard, Philadelphia.....5

Sand and Emery Paper. *Makers of*
Beader, Adamson & Co., 730 Market, Phila.....6

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Hammond W. S., Lewisberry, Pa.....35

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American Saw Co., Trenton, N. J.....10
Atkins E. C. & Co., Indianapolis, Ind.....10
Boynton E. M., 80 Beekman N. Y.....10
Flint J., Rochester, N. Y.....10
Disston Henry & Sons, Phila.....23
James Ohlen, Columbus, O.....10
Peace Harvey W., Williamsburg, N. Y.....10
Spear & Jackson, 100 Chambers, N. Y.....33
Wheeler, Madden & Clemson Mfg. Co., Middletown, N. Y.....10

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Boynton E. M. 80 Beekman, N. Y.....10
Peace Harvey W., Williamsburg, N. Y.....10

Seamless Tubes. *Makers of*
Merchant & Co., Phila., Pa.....3

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Chattillon John & Sons, 91 Cliff, N. Y.....9
Henkle Bros., 9th near Coates, Phila.....26

Screws. *Makers of.*
Miles F. S., 205 Quarry, Phila.....12

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Bruce Geo. W., 1 Platt, N. Y.....11
Field Alfred & Co., 93 Chambers, N. Y.....6
Gueutal George & Son, 39 W. 4th, N. Y.....10

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Clement & Hawks Mfg. Co., Northampton, Mass....12
Middleboro Shovel Co., 63 Oliver, Boston.....12

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R. Heinisch's Sons, 3 & 1 Broadway, N. Y.....11
Ryals Jas., Collinsville, Ct.....11

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Clark & Co., 218 W. 26th st.....24

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Hooks Smelting Co., Phila., Pa.....8
Reeves Paul S., 760 South Broad St. Phila.....40

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Shepard Sidney & Co., Buffalo, N. Y.....21
Sturges Frank & Co., 72, 74 & 76 Lake, Chicago.....3

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Dudgeon Richard, 24 Columbia, N. Y.....36

Stencils. *Manuf

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STOVE AND RANGE LININGS
of every description. Linings for Cupola or Foundry Furnaces. Blocks, Tiles, McKenzie Cupola Brick, &c.
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For Fire and Red Brick,
PATENT STEAM GEARING
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Oldest and Largest Establishment of the kind in the U. S
F. L. & D. R. CARNELL,
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Having established himself in the Iron and Machine Business in Water St., Perth Amboy, is now prepared to execute all orders in machinery, such as STEAM ENGINES, BRICK MACHINES, BRICK PRESSES AND TILING MACHINERY. Also, Steam Fitting, and Iron and Brass Castings, &c., furnished in the shortest time, and in the best and most workmanlike manner.

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Clay Tempering Machines
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The Double-action Hinge, as shown when door is shut—both sides alike with four combination springs.
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And all
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It has no equal. It swings the door both ways, forms a solid attachment on each side. Has four combination springs acting together, cannot settle nor sag. Will carry any weight, and is decidedly the Finest, Strongest, and Best made.
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Manufacturers of Benezet and Clarion Brands of FIRE BRICK.

For steel melting holes, Siemens Gas Furnaces, Bessemer Steel Mills, Hearths and Boshes of Blast Furnaces, Fire Box Arches, &c., &c., our Benezet is unequaled. For Rolling Mills, Foundries, Linings and Hot Blasts of Furnaces, Lime Kilns, &c., our Clarion is unsurpassed.
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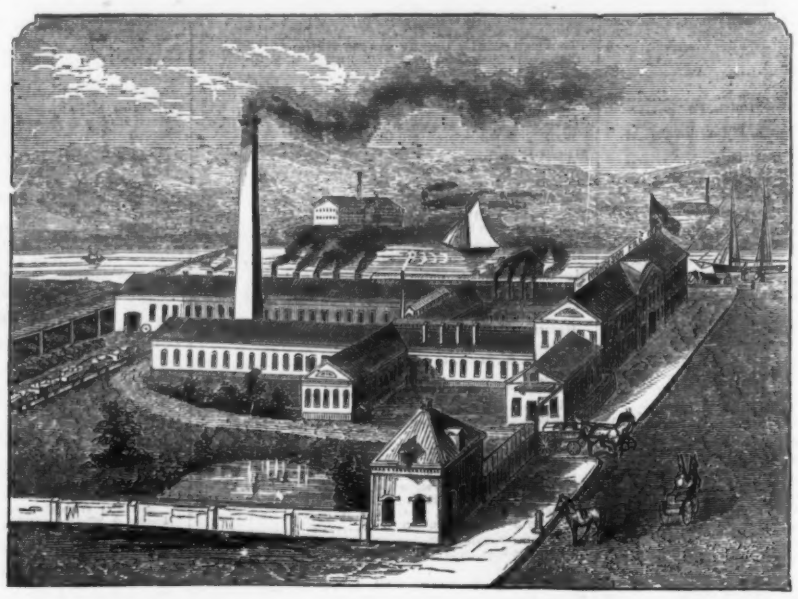

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Finally.—Our Files **are warranted** to be **hard, well cut** and **sound.** They are exclusively used by many of the largest Railroads and Machinists in the country—and the vigorous growth of our reputation, not only for making a good article, but of **our ability to furnish a good article cheap,** is evidenced by the large number of Dealers and Jobbers who are handling our Files exclusively.

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All our goods are manufactured from patent faced iron plates; they have a smooth face and bright finish.
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New York Fire Brick & STATEN ISLAND CLAY RETORT WORKS,
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Office, 58 Goerck Street, cor. Delancy Street, East River, New York.
The largest stock of Fire Brick of all shapes and sizes on hand, and made to order at short notice.
Cupola Brick, for McKenzie Patent, and others. Fire Mortar, Ground Brick, Clay and Sand. Superior Kaolin for Rolling Mills and Foundries. Stone Ware and other Fire Clay and Sand, from my own mines at New Jersey and Staten Island, by the cargo or otherwise.

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ESTABLISHED 1836.
JOHN R. WATSON, Perth Amboy, New Jersey.
Manufacturer of
FIRE BRICK,
For Rolling Mills, Blast Furnaces, Foundries, Gas Works, Lime Kilns, Tanneries, Boiler and Grate Setting, Glass Works, &c.
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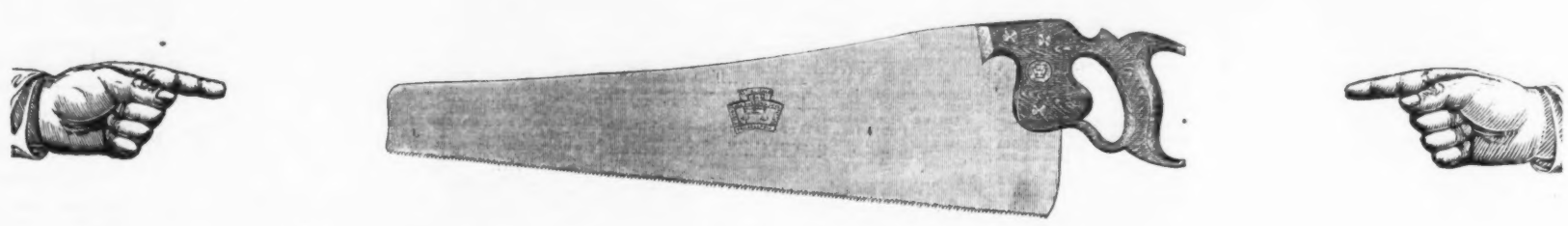
HENRY DISSTON & SONS,

Keystone Saw, Tool, Steel and File Works.

Front and Laurel Streets, Philadelphia.

Henry Disston & Sons New Patent Skew Back Hand Saw

"CENTENNIAL No. 76."



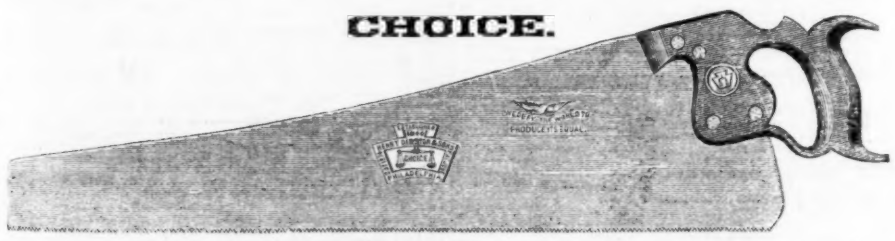
TO THE HARDWARE TRADE.

GENTLEMEN: We are prepared to supply the trade with an entirely new Hand Saw, called the "Centennial No. 76." This Saw is ground on the back, to taper gradually from butt to point, being only 26 gauge at the point. By this mode of grinding, the Saw, when tested, makes a complete "whip bend." The handle is apple-wood, oil finish, the screws are flush and polished, and the Saw is superior to any ever offered to the trade in this or any other country at the price. It is the sweetest-cutting, nicest-hanging Saw that can possibly be manufactured, feeling as light as a feather at the point, owing to its peculiar construction. The screws are finished before being put into the handle, and, should they become loose, can be readily tightened with an ordinary screw-driver, and still make a good finish. It was our intention to keep this Saw from the market until Centennial year; but second thought has decided us to give the trade an opportunity to test it before then, that they may know whether they can put it in stock without risk. The price of this Saw at present will be the same as that of the regular No. 7. It is a "hard times" Saw, and we do not know how long the price can be sustained. Mr. Henry Disston is willing to risk his reputation as a Saw-Maker upon "the Centennial No. 76." Send for samples and put them in the hands of the Carpenters—to be returned if not as represented.

November, 1876.

HENRY DISSTON & SONS'
New Patent Skew-back Hand-Saw,

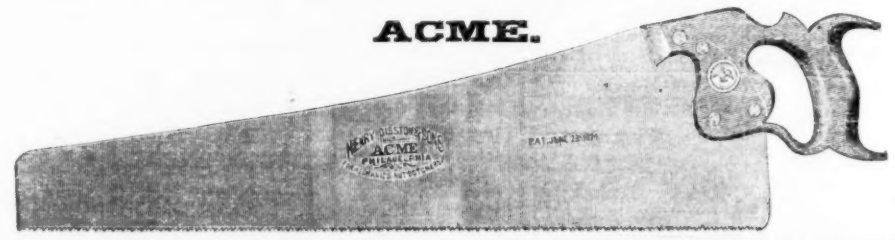
CHOICE.



This Saw is the "CHOICE" of all first-class Mechanics who have used it.

HENRY DISSTON & SONS'
New Patent Skew-back Hand-Saw,

ACME.



We consider these Saws to be the ACME of perfection. So say all first-class Mechanics who have used them.

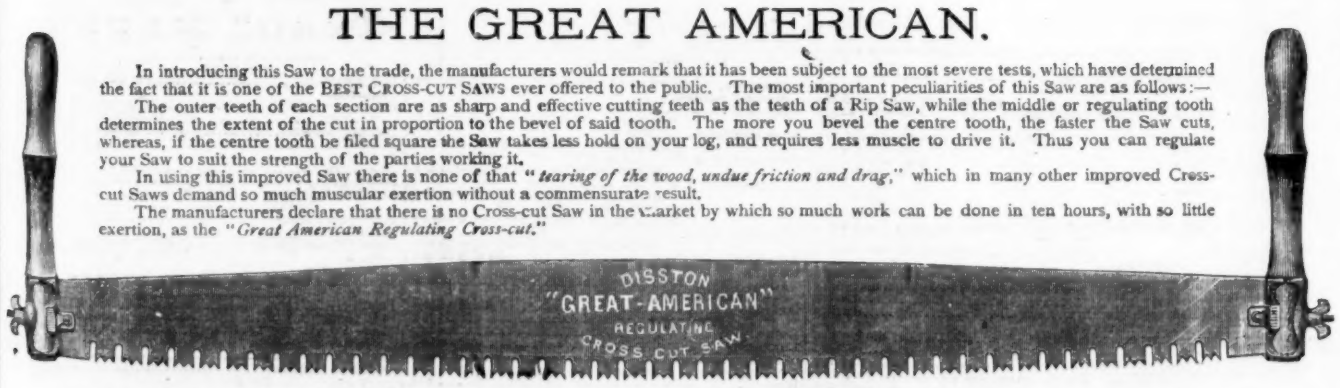
THE GREAT AMERICAN.

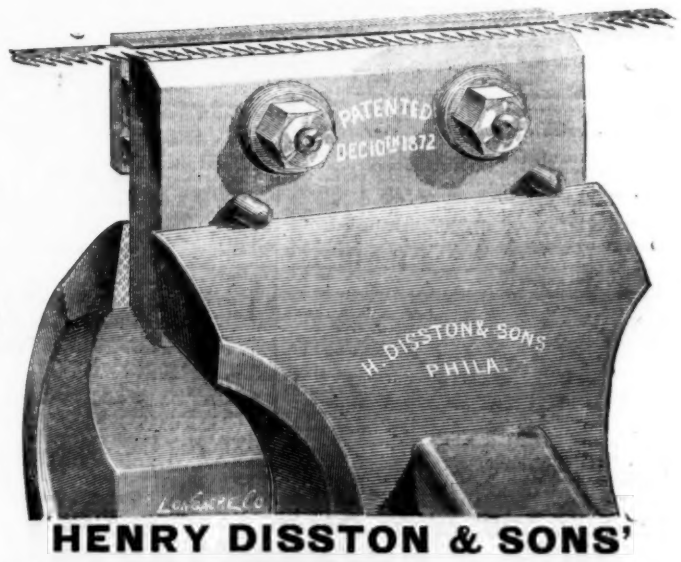
In introducing this Saw to the trade, the manufacturers would remark that it has been subject to the most severe tests, which have determined the fact that it is one of the BEST CROSS-CUT SAWS ever offered to the public. The most important peculiarities of this Saw are as follows:—

The outer teeth of each section are as sharp and effective cutting teeth as the teeth of a Rip Saw, while the middle or regulating tooth determines the extent of the cut in proportion to the bevel of said tooth. The more you bevel the centre tooth, the faster the Saw cuts, whereas, if the centre tooth be filed square the Saw takes less hold on your log, and requires less muscle to drive it. Thus you can regulate your Saw to suit the strength of the parties working it.

In using this improved Saw there is none of that "*tearing of the wood, undue friction and drag*," which in many other improved Cross-cut Saws demand so much muscular exertion without a commensurate result.

The manufacturers declare that there is no Cross-cut Saw in the market by which so much work can be done in ten hours, with so little exertion, as the "*Great American Regulating Cross-cut.*"





HENRY DISSTON & SONS'

Patent Setting Stake

For Setting Web, Jig, Band or any kind of Narrow Saws.

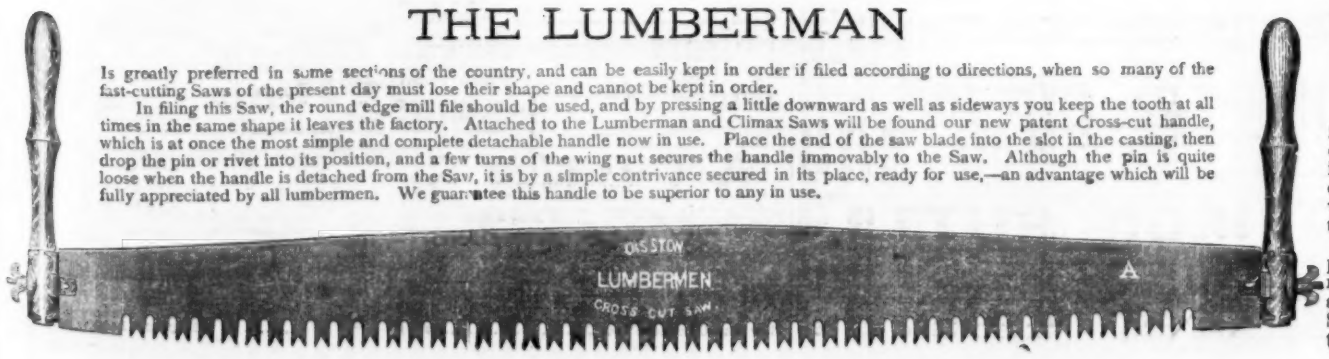
The principal difficulty experienced in setting a narrow Saw arises from the fact that the blade is liable to tilt or slide backward as each successive tooth is struck by the hammer. The back guide with its projecting lip, under which the Saw passes and is securely held during the process, effectually prevents these difficulties and holds the Saw up to its work; thus the operator is enabled to strike the tooth with certainty every time, and prevents any distorting of the saw blade.

The guide can be adjusted to various widths, by inserting or removing packing, as occasion may require. Either edge of the set can be used by reversing the back guide, and as the edges are of different sizes, they are adapted to Saws of different widths. A narrow Saw set by the aid of this Stake remains as straight after as before; a result which cannot be attained by any other means.

THE LUMBERMAN

Is greatly preferred in some sections of the country, and can be easily kept in order if filed according to directions, when so many of the fast-cutting Saws of the present day must lose their shape and cannot be kept in order.

In filing this Saw, the round edge mill file should be used, and by pressing a little downward as well as sideways you keep the tooth at all times in the same shape it leaves the factory. Attached to the Lumberman and Climax Saws will be found our new patent Cross-cut handle, which is at once the most simple and complete detachable handle now in use. Place the end of the saw blade into the slot in the casting, then drop the pin or rivet into its position, and a few turns of the wing nut secures the handle immovably to the Saw. Although the pin is quite loose when the handle is detached from the Saw, it is by a simple contrivance secured in its place, ready for use,—an advantage which will be fully appreciated by all lumbermen. We guarantee this handle to be superior to any in use.



New York Wholesale Prices, December 15, 1875.

HARDWARE.

Anvils.
Wright's ₩ lb gold 10½c; over 250 lbs 11c, gold
Armitage's Mouse Hole gold 11c
Wilkinson's ₩ lb gold 11c
Eagle Anvils (American) ₩ lb 10c dis 20 %

Apple Parers.
Domestic
Turn Table
Lightning
Hudson's $7.75 ₩ doz
Reading
Union

Skeleton Paring, Coring and Slicing $8 00 ₩ doz net
Bay State, Paring, Coring and Slicing $15 00 dis 10 %
Climax Slicer 8 00

Ash Sifters.
J. E. Corning's Barrel Head dis 10 %
Rival ₩ doz $12·00 net
Square per doz $2·50 dis 20 %

Augers and Bits.
Conn. Valley Mfg. Co.
Douglass
Ives
Beecher (French, Swift & Co)
Griswold
Challenge
} 1st quality dis 40&10 %
Nobles Mfg. Co dis 40 @ 40 & 5 %
Cook's d's 40&10&10 %
Diamond Hardware Co dis 25&10&10 %
Snell Mfg. Co dis 25 %
Jennings' Bits dis 10 %
Lewis' Single Twist Bits dis 30 %
Andrews' Bits dis 25 %
Griswold's Patent Bits dis 30 %
Expansive Bits, Clark's small, $18; large, $26—dis 15 %
" Ives' $30 @ $30—dis 30 %
" " Blake's $20—dis 40 %
Hollow Augers, Douglass'
" Ives'
" French, Swift & Co.
" Bonney's Adjust. ₩ doz $48—dis 25&10 %
" Stearns' " ₩ doz $48—dis 25&10 %
" Ives' Expansive each $4·50—dis 40 %
" Universal Expansive each $4·50—dis 10 %
} dis 40 %
Gimlet Bits—Screw, $7·50; no screw, $9 dis 20&10 %
Double Cut Gimlet Bits, Shepardson's dis 30
" Ct. Valley Mfg. Co. dis 30&10 %
" Hartwell's dis 50 %
" Douglass' dis 25&10 %
" Ives' dis 30 %
Morse's Bit Stock Drills dis 20 %
L'Hommedieu's Ship Augers dis 20 %
Watrous Ship Augers dis 20 %
Vaughan's Post Hole—
6 in. $26 00; 7, 8 and 9 in. $25 per doz dis 20 %

Awls, Brad Sets, &c.
Awls, Sewing, Common per gross $1·20—dis 15 %
" Best per gross $1·60—net
" Shouldered Peg per gross $2·25—dis 15 %
" Patent Peg per gross $2·25—dis 15 %
" Shouldered Brad per doz $13 80—dis 40 %
Brad Sets, Aiken's No. 42, $10·50; No. 43, $12·50 dis 45&10 %
" Clark's dis 40&10 %
" Stanley's Excelsior $18 50—dis 25&10 %

Axes.
Brook's per doz $12 00 @ 14 00 net
Blood's per doz $15 00 @ 16 50—dis 20 %
Hunt's ₩ doz $12 50 @ 14 00
Collins' ₩ doz 11 00 @ 15 50 net @ dis 5 %
H. Clark's (J. C. W. & Co.) Bron'd or red ₩ doz $10 00 net
Hurd's ₩ doz 10 50 @ 12 50
Simmons' ₩ doz 11 00 @ 11 50
Morris' ₩ doz 12 50 @ 13 50
Red Jacket ₩ doz 12 00 @ 12 50
Mann's ₩ doz 11 50 @ 13 00
" Double Bitted ₩ doz 21 50 @ 22 00
Underhill's ₩ doz 12 00 @ 13 00
" Crown ₩ doz 12 50 @ 13 50
John Leverett's ₩ doz 12 50 @ 15 50
Ten Eyck ₩ doz $10 00 @ 12 50 net
M. H. Jones & Co ₩ doz 10 50 @ 11 50 net
Nobles Mfg. Co per doz $10 50, net
Elephant per doz $10 50 @ 11 50 net

Axle Grease.—Frazer's ₩ lb 6c.

Balances dis 35 %

Bands.—Plated new list dis 50&5 %
Iron Rim new list dis 25&5 %
Brass (Plated list) new list dis 50, 10&5 %
Oroide new list dis 50&5 %

Belts.
Hand, Light Brass dis 70&10 %
" Extra Heavy dis 40&10 %
" White Metal dis 50&10 %
" Silver Chime dis 20&10 %
" Swiss dis 25 %
" Globe (Cone's Patent) dis 2·&10 %
Gong, Abbe's dis 25&10 %
" Yankee dis 35&10 %
" Barton's dis 35 %
Crank, Taylor's dis 25 %
" Brook's dis 50 %
" Cone's dis 40 %
" Connel's dis 50&10 %
Lever, Sargent's dis 60&10&10 %
" Taylor's dis 25 %
" Hart, Bliven & Mead Mfg. Co dis 50&10 %
Pull, " " " " dis 50&10 %
" Brook's dis 50 %
" Western dis 25 %
Call dis 15 %
Cow—Common Wrought dis 20&10 %
" Western dis 30&10 %
" " Sargent's dis 50&10&10 %
" Kentucky "Star" dis 20&10 %
" " Sargent's dis 50&10&10 %
" Dodge's Genuine Kentucky, new list—
Nos. 0 1 2 3 4 5 6 Hog.
$14·00 10·00 8·00 6·00 5·00 3·50 2·50 5·00—dis 45 %
" Yaw's Genuine dis 35 %
" Texas dis 35 & 40 %

Bellows.
Blacksmiths', Common, List of Sept. 15 dis 15 %
" Extra and Pittsburgh Pattern List net
Moulders' dis 20 %
Hand Bellows dis 10 %

Blind Adjusters.—Domestic ₩ doz $3—dis 20 %

Blind Fasteners.
Mackrell's dis 30 %
Van Sand's, No. 2000, $14·00; No. 3705, $10·50 net @ dis 5 %
Washburn's Patent ₩ gross $14 00 dis 5 %
Merriman's new list net

Blind Staples.
Boardman's Patent, ⅞ in. and larger ₩ lb 37 c
" ⅝ in " " 42 c

Blocks.
Differential Pulley Blocks dis 25 %
Tackle, Rope and Iron Strapped, Providence Tool Co.'s list dis 30 %
Burr's dis 10 %
Stanley Rule and Level Co dis 25&10 %

Bolts.
Cast Iron Barrel, Shutter, &c dis 60&10 %
Cast Iron Chain dis 60&10&10 %
Wrought Iron Barrel dis 50, 10&10 %
" Square dis 50, 10&10 %
" " Shutter dis 60&10 %
Wrought Iron Flush, Stanley's dis 15&10 %
" " Sargent's dis 50&10&10 %
Carriage and Tire, Common dis 75 %
" " Norway Iron dis 50 & 10 %
" " R. B. & W. (old list) dis 60 %
" " Philadelphia dis 60&5 %
" " Shelton's (old list) dis 40&10 %
Union Nut Company, old list dis 65&5 %

Stove
" R. B. & W. dis 25 %
" Shelton's Shaved Head dis 25 %

Borax 13c. ₩ lb

Boring Machines.

	Upright.	Angular.
Hoyer's, no Augers	$5·15	$4·00 net
" with Augers	5·00	6·00 net
Douglass', no Augers	3·25	4·00 net
" with Augers	4·40	6·00 net
Parr's, no Augers	5·00	7·50 dis 30 %
" with Augers	7·50	10·00 dis 30 %
Kellogg's, no Augers	5·25	6·75 dis 15 "
Sweets' "	4·75	6·25 dis 15 "
Snell's, "	4·75	6·25 dis 20 "
Phillips', with Augers	....	10·00 dis 25 %

Mortising Machines, $30·00 each dis 30 %

Bow Pins.
Union Nut Co new list dis 50&10&5 %
Hotchkiss' dis 50 @ 5 %
Humason, Beckley & Co.'s dis 50&10&5 %
Sargent & Co.'s dis 50&10&10 %

Braces.
Barber's Patent dis 40&5 %
C. S. Backus dis 4·&10 %
Wilson Mfg. Co dis 10 %
Spofford's Patent dis 50 %
Noble's Patent dis 40&5 %
Ives' Novelty dis 40&7½&10 %
" Hamden dis 25&10 %
Common Bell (American) dis 25 %

Brackets.—Shelf dis 60&10 @ 65&10 %

Bright Wire Goods dis 65&10&10 %

Bull Rings.—Union Nut Co dis 50&2·5
Sargent's dis 60&10 %
Hotchkiss' 2½ in., $2·25 net

Bung Hole Borers.
Common and Ring dis 30&10 %
Ives' Tap Borers dis 10&10 @ 25 %
Enterprise Mfg. Co dis 20 %

Butchers' Cleavers.
Humason & Beckley Mfg. Co dis 20&10 %
Bradley's dis 25 %
Beatty's dis 20 %

2	3	4	5	6	7	8	9
$17·00	$21·00	$24·00	$27·00	$30·00	$37·50	$39·50	$42·00

Hart Mfg. Co dis 45&10 %

0	1	2	3	4	5	6
$29·25	$29·75	$34·25	$38·75	$43·25	$49·50	$54·00

Butts.
Wrought Brass dis 30 %
Cast Brass dis 20 %

Common Cast, not Drilled.

Fast Joint, Narrow new list July dis 20&10 %
" Broad " " dis 40&10 %
" " Jap'd " " dis 35&10 %
Loose Joint, Narrow and Broad " " dis 50&10 %
" " " Jap'd " " dis 45&10 %
Parliament Butts & Mayer's Hinges " " dis 4 &10 %
Loose Pin " " dis 45&10 %
" " Japanned " " dis 5·&10 %
Loose Pin, Jap'd, Plated Tips " " dis 50&10 %

Drilled and Wired.

Fast Joint, Narrow new list July 1, dis 25&10 %
" Broad " " dis 35&10 %
" " Japanned " " dis 30&10 %
Loose Joint new list July 1, d's 45&10 %
" Japanned " " dis 45&10 %
Parliament & Mayer's Hinges " dis 35&10 %
Loose Pin " dis 40&10 %
" Japanned " dis 50&10 %
" " Plated Tips " dis 45&10 %

Union Mfg. Co.'s Fancy Butts.—
Figured Enameled Loose Joint dis 55&10 %
Nickel Plated " dis 33½&10 %
Boston Finish, Plain dis 30&5 %
" " with Iron Acorns dis 75&5 %
" " with Sil'd " dis 65&5 %

Wrought Iron.

Fast Joint, Narrow, Lt. and Regular dis 30 %
" Broad dis 35 %
Loose Joint, Narrow and Broad dis 35 %
Table Butts, Back Flaps, &c dis 30 %
Inside Blind, Regular dis 30 %
" " Light dis 40 %
Loose Pin, Wrt dis 35 %
Am. Spiral Spring Butt Co., list May 1st dis 25 %
Union Spring Hinge Co dis 20 %
Blind Butts, Parker dis 65&10 %
" Palmer dis 40 %
" Seymour dis 60&5 %
" Shepard dis 60 @ 6·&10 %
" Lull & Porter dis 60 %
" Nicholson dis 45&10 %
" Huffer dis 33½&10 %
" Garretson, No. 1 dis 6·%
" Clark's, Nos. 1, 3 and 5 dis 65&10 %
" Clark's No. 2 dis 70&10 %
" " Nos. 2 4, 4½, 6, 8, 10 dis 45 %

Can Opener.
Messenger's Comet per doz $3·00 dis 20 %
American per doz 2·25 dis 4·%
Lyman's per doz 3·75 dis 20 %
No. 4, French per doz 2·25 dis 40 %
No. 5, Iron Handle per doz 2·25 dis 40 %

Sprague's

	1	2	3	4
Nos.				
Per doz	$4·00	4·50	5·00	9·00 dis 55&10 %

Star per doz $5·00 dis 2·&10 %
Eureka per doz $3·50 net
Sardine Scissors per doz $7·00 dis 40 %

Caps—Percussion, per 1000.
G. D .37 @ 40c
Ely's E. B. 1-4s, 55c.; 1-10s, 70c. gold
" Double Waterproof, 1-4s, $1·45; 1-10s, $1·52½c., gold
Colt's 1-10s 90c gold

Carpet Sweepers.
Bissell each $2 75 net
Union each 2 75 net
Welcome dis 55&5 %

Cartridges.—Metallic dis 30&10 %

Carts.—Horse and Curry dis 10&10 %
Cotton dis 15&10 %
Wool dis 15&10 %

Carpet Stretchers.
Cast Steel, Polished per doz $3·00 dis 30 %
Cast Iron, Steel Points per doz $2·00 dis 45&5 %

Casters.
Bed dis 30&10 @ 40 %
Plate and Shallow Socket dis 40&10 %
Deep Socket dis 35 & 40 %

Cattle Leaders new list dis 60&10 %

Chain
English Coil net gold

₩ lb	11/4	3/8	7/16	1/2	1/4
	3-16		5-16	3/8	7-16

Trace, 6½-10-2 by the cask, ₩ pair, gold 55c
Trace, 7-10-2 by the cask, ₩ pair, gold, 42c
German Halter Chain dis 20 @ 25 % gold
German Coil dis 20 @ 25 % gold
Galvanized Pump Chain ₩ lb 13c
Jack Chain, Iron dis 50&10 %
" Brass dis 40&10 %

Chalk.
White ₩ gross, 57c net
Red ₩ gross, 90c net
Blue ₩ gross, 1·00 net
White Crayons ₩ gross, 16½c net

Chisels.
Socket Framing, Douglass, Extra dis 60&10&10 %
" " Crossman dis 50&15&10 %
" " Buck Bros. equivalent to dis 50&17½ %
" " Hart Mfg. Co dis 60&10 %
" " Merrill dis 60&10 %
" Firmers, Douglass, Extra dis 60&10&10 %
" " Crossman dis 50&10&10 %
" " Buck Bros. equivalent to dis 50&15 %
" " Hart Mfg. Co dis 60&2·5
" " Merrill dis 60 %
Socket Corner dis 60&10 %
Tanged Firmers dis 40&10 %
" " Butcher's $5·50 to £ gold
" " Newbould's $5·50 to £ gold
" " Spear & Jackson's $5·00 to £ gold
" " Buck Bros (Shank) $5·00 to £ gold

Clamps.
Iron, Providence Tool Co.'s dis 20 %
" Adjustable, Gray's dis 2·%
" " Lambert's dis 40&5 %
" " Snow's dis 10 %
" " Hammer's dis 60&10 %
" Cabinet see vises
Saw Clamps

Clips, Axle.
Norway or Best dis 30 @ 40 %
Superior dis 50 @ 5·%

Coal Shovels.

Wrought Iron. Nos.	1	2	
Long Wrt. H dles. per gross,	$15·00	18·00	dis 25 %
Short " "	12·00	14·00	dis 25 %
Wood Handles " "	12·00	14·00	dis 25 %
Gem (Edgar's Pat.)	15·00	18·00	dis 25 @ 30 %

Cast Iron, Iron Handle per doz, 75 @ 80c. net
" Wood Handle per doz, $1·00 net

Coal Hods.

Incn.	14	15	16	17	18	
Regular, Jap'd per doz,	$12·00	12·75	13·50	15·50	16·00	dis 60&10 %
Regular, Gal'd "	15·00	16·00	17·50	19·50	22·50	dis 50&10 %
Ladies' Favorite, Jap'd ₩ doz	15·00	16·00	18·00	20·00		dis 50 %
Ladies' Favorite, Galvanized "	19·00	20·00	22·00	23·00		dis 45 %

Funnel Hods.—

Nos.	15	16	17	
Oriental, Japanned ₩ doz.	$16·50	18·00	20·00	dis 50 %
" Galvanized "	21·50	22·50	24·00	dis 40 %
Morning Glory, Jap'd "	16·50	16·00	20·00	dis 50 %
" Gal'd "	21·00	22·50	24·00	dis 43 %
Iron Clad, Jap'd "		21·50		dis 60&10 %
" " Gal'd "		22·50		dis 50&10 %

Sidney Shepard & Co.'s new list dis 10 %

Cockeves...1¼ in., 28c.: 1¾ in., 33c.; 1¾ in., 81c. net

Cocks.
Brass Racking dis 30&10 %
Lock and Globe dis 30&10 %
Lever Bibbs dis 30&10 %
Ale and Beer dis 25&10 %

Coffee Mills.
Board and Box dis 15 @ 20 %
Brighton dis 20 %
Increase Wilson's dis 2·%
Selsor's Pat $9·50, $10·50—dis 25 %
American (Enterprise Mfg. Co.) dis 2·%
French Steel dis 2·%
The Swift dis 20 %

Compasses and Dividers.
Bemis & Call Co.'s dis 35&10 %
Cook's dis 15 %
Excelsior dis 40 %
Peck Stow & Wilcox dis 25 %
Miller's Patent dis 25&10 %

Coopers' Tools.
Bradley's dis 15 @ 20 %
Chas. E. Little dis 20 @ 25 %
Swan & Brumbacher dis 15 @ 20 %

Corkscrews.

Corn Knives and Cutters.
Bradley's dis 10 %

Crow Bars.
Cast Steel ₩ lb 11c. net
Iron, steel points ₩ lb 5c

Crucibles.—Gautier & Co ₩ No. 5, 5c

Curling Irons, &c.
⅜, ½, ⅝ in., $1·80, $2·00, $2·40 dis 10 %
Curling Tongs ₩ doz $6 50—dis 15 %
Pinching Irons ₩ doz 7 50—dis 20 %

Curry Combs.
Hotchkiss' & Kellogg's, Iron & Brass, old list dis 40 %
Fitch's (List of No. 240, $1) dis 20&10 %
Rubber ₩ doz, $9·00—dis 15 %
Wood Tooth (Fuller Bros.) per doz $2·25 net

Curtain Pins.—Silvered Glass new list dis 15 %

Cutlery.
American Table { Meriden / Cutlery Co } New list Jan. '75, dis 25 %
American Pocket { Cutlery Co } dis 25 %
Am. Pocket—Humason & Beckley Mfg. Co dis 20&10 %
Am. Miller Bro.'s Cutlery Co dis 25 %
Naugatuck Cutlery Co dis 2·%

Dippers.
Britannia per doz 75c—dis 30 %; by bbl. dis 32½ %
Cocoa, Plain per doz $3·25—dis 20 %
" Rimmed per doz 3·75—dis 20 %

Dog Collars.
Embossed Gilt dis 20 %
Leather dis 30 %
Brass dis 20 %

Door Springs.
Gem (V. W. & W.), No. 1 Large, Jap'd ₩ doz $3·50
" " No. 2 Medium ₩ doz 2·50
" " No. 3 Small ₩ doz 2·00
} dis 10 %
Gray's (V. W. & W.) ₩ doz $2·50 net
Torrey's Pattern (V. W. & W.) ₩ doz $2·50 net
Torrey's Patent ₩ doz $2·50 net
Johnson's per doz $3 00 net
Philadelphia 5 in., $3·00 8 in., $7·00 dis 15 %
Palmer's Japanned No. 6 ₩ doz $5·00
" Coppered " " 6·00
" Silvered " " 8·00
} dis 20 %

Challenge— Nos.	9	7	6	
Japanned per doz	$2·00	2·50	3·00	
Coppered "	4·00	4·50	5·00	
Galvanized "	3·50	4·00	4·50	dis 10 %
Nickeled "	5·50	6·00	7·00	

Barker's Concealed dis 12½ %

Drawing Knives.
Crossman's No. 1 dis 50&15&10 %
Douglass, Extra dis 60&10&10 %
Hart Mfg. Co., No. 1 dis 60 %
Merrill dis 60&10 %
Nobles Mfg. Co dis 15 %
Bradley's dis 25 %
Adjustable Handle dis 15 %

Drills and Drill Stocks.
Blacksmiths' each $2 00 net
" Self-Feeding each $6 00 net
Breast, P. S. & W dis 45 %
" Aiken's dis 25&10 %
" Hotchkiss dis 10 %
" Wilson's dis 10&5
" Miller's Falls dis 25 %
Ratchet, Merrill's dis 20 %
" Ingersoll's (old list) dis 35 %
" Whitney's dis 20 %
Ratchet, Weston's dis 20 %
" Moore's Triple Action dis 20 @ 25 %
Wilson's Drill Stocks dis 10 %
Automatic Boring Tools each $2·75—dis 20 %
Beach Patent (Morse) dis 15 %

Drill Chucks.—The Danbury..each 10·00, dis 20 @ 25 %

Egg Beaters.

Monroe's	8 in.	10 in.
Per doz	$8·00	9·00

Dover ₩ doz $6·00—dis 10 %
National ₩ doz $4·50—dis 20 %
Peerless ₩ doz $3·00—net

Emery.
Genuine Chester—Regular Nos. ₩ lb 6c
" Flour and FF ₩ lb 4c
} dis 10 %
Washington Mills—Regular Nos. ₩ lb 8c
" Flour ₩ lb 5c

Enameled and Tinned Ware.
Kettles dis 30 @ 40 %
Sauce Pans dis 25 %
Glue Kettles dis 25 %
Tinned Saucepans dis 25 %

Escutcheons.
Door Lock Same discounts as Door Locks
Brass Turned dis 60&10 %
Wood dis 25 %

Faucets.
Fenn's dis 50 %
" Cork Stops dis 40 %
Star dis 55&10 %
Frary's Patent Petroleum dis 15&10 %
Taylor's Pattern " dis 20&10 %
Wood and Metallic " dis 40 %
Wood, Cork Lined dis 60 @ 65&5 %
Enterprise Mfg. Co., Self-Measuring dis 20 %

Feilloe Plates. ₩ lb 15c; dis 25&10 %

Files.
American File Co $5 00 to £ currency—dis 20 %
Arcade File Works $5·00 to £ currency
Auburn File Works $5 00 to £ currency
Nicholson new list, Jan. 1, 1875, net @ 5 %
Hartford File Co $5 50 to £ currency—dis 10 %
L. B. Heller & Co $5 00 to £ currency
Heller & Bros $5 00 to £ currency
"Western" 5 00 to £ net
Wheeler, Clemson & Co $5 00 to £ currency
Rothery's $5 to £ currency
J. & Riley Carr 5 25 to £ gold
" " Horse Rasps 5 50 to £ gold
Stube's $ 50 @ 9 00 to £ gold
Butcher's 5 25 to £ gold
Walter Spencer & Co.'s "Diamond" 5 00 to £ gold
Spear & Jackson's 5 00 to £ gold
Jowitt's 4 50 to £ gold
Newbould's 5 25 to £ gold
W. K. & C. Peace's "Imperial" 5 25 to £ gold
R. Ibbotson 5 00 to £ gold
Turton Bros. & Matthews $5 50 to £ currency
Fisher & 4 75 to £ gold
Goodlad's 4 00 to £ gold
Moss & Gamble 5 25 @ 5 50 to £ gold
Thos. Turner & Co. (Peter A. Frasse & Co.) 5 00 to £ gold
" " Horse Rasps 5 25 to £ gold
"Philo Sheffield," P. T. Co 5 00 to £ gold
Limet & Co. (French) 5 00 to £ gold

Fluting Machines.
Mrs. Coles' Pony..4 in. $4·75; 5 in., $5; 6 in.. 5·50; 7 in., $6
Knox with 4-inch Rolls 3 50 each net
" " 6 " 4 50 each net
" " 8 " 6 75 each net
O. K 6 50 each net
Peerless, 4-inch Rolls 4 00 each net
" 5 " 4 75 each net
Excelsior, No. 1 4 50 each net
" No. 2 6 50 each net
Diamond 7 50 each net
Champion, 6 inch rolls 6 00 each net
" 4 inch rolls 5 00 each net
Climax 7-inch Rolls 8 00 each net
" 4½ " 6 50 each net
Empire 4 00 each net
Eureka, No. 1, 7-inch Roll 8 00 each net
" No. 2, 5-inch Roll 6 00 each net
Defiance, 4 in., $4·50; 6 in., $4·00; 8 in., $6·50 each net
K. F. M., 4½-inch Roll 5 50 each dis 15 %
" 6-inch Roll 6 00 each dis 15 %
Myers' Fashion Fluter, 4½ inch Rolls 2 75 each net
" Convex Brass Fluter, Sad Iron attachment per doz $15·00
Domestic Fluter $1·60 each net
Geneva Hand Fluter $15 00 per doz net

Fluting Scissors. dis 25&10 %

Forges.
"Empire" (W. P. Kellogg & Co.) dis 20 %

Forks.
Hay, Manure & Spading dis 33½ %
Plated A 1 dis 50 %

Fry Pans.

Burnished, P. S. & W., new list						dis 50 %
₩ doz	$3·00	3·75	4·25	4·75	5·25	6·00 7·00 8·00 9·00

No	0	1	2	3	4	5	6	7
Smith, Burns & Co., "Excelsior" Polished								dis 35 %
₩ doz	$6·70	4·00	4·70	5·20	6·00	7·00	8·00	9·00

No.	1	2	3	5	6	7	8
Gas Stoves.							
Tiff & Howard							dis 20 %

Gauges.
Marking dis 4·&10 %
Wire dis 10 %
" Smith's Patent per doz $18 00, dis 40 %

Gimlets.
Nail and Spike dis 25&10 %
Double Cut, Shepardson's dis 30 %
" " Hartwell's dis 40 %
" " Ives' dis 2·%
" " Douglass' dis 20&10 %

Glue Pots.
Tinned and Enameled dis 25 %
Family, Howe's "Eureka" dis 2·%
" L. E. & C.'s "Handy" dis 25 %

Grind Stone Fixtures
Sargent's Patent dis 65&11 %
Reading Hardware Co dis 70&10 %
J. F. Green & Bro dis 20 %
Hart Mfg. Co.'s dis 60&5&10 %
Rick Bros dis 45&5 %

Hammers.
Emmet Hammer Co.'s Handled dis 25 %
" Sledge & Stone ₩ lb 40c.; dis 40 %
Humason & Beckley Mfg. Co dis 16⅔&10 %
Maydole & dis 12 %
Henry Hammonds' (Maydole's List) dis 12 %
Cheney's net @ dis 5 %
Verree dis 5 %
Yerks & Plumb dis 20 %
Magnetic Tack dis 25&10 %
Warner & Noble's dis 10 %

Hand Cuffs and Leg Irons.
Tower's Hand Cuffs, $4 00 per pair } dis 25 %
" " Leg Irons $ 50 per pair.
Providence Tool Co.'s Hand Cuffs $15 per doz } dis 10 %
" " Leg Irons 25 "

Handles.
Door or Thumb Latches—

Nos.	0	1	2	3	4	
Per doz	$1·80	1·00	1·18	1·25	1·50	dis 60 %

Roggin's Latches 40c. @ 50c. net
Bronzed Iron Drop Latches per doz $1·00 net
Wrought Chest dis 60&10 %
Surface Chest dis 65&10&10 %
Flush Chest dis 60&10&10 %
Lifting dis 60&10 %
Coffin dis 50&10 @ 60&10 %
Saw and Plane dis 25&10 %
Hammer and Hatchet dis 10 %
N. Carolina Handle Co dis 15 %

Brad Awls						per gross	$5 50—dis 20&10 %
Hickory Firmer Chisel, ass'td				large	"		5 25—dis 20&10 %
" " "				large	"		6 00—dis 20&10 %
Apple " "				ass'td	"		6 00—dis 20&10 %
" " "				large	"		7 50—dis 20&10 %
Socket " "				ass'td	"		8 50—dis 20&10 %
" Framing "				"	"		7 00—dis 20&10 %
File				"	"		4 00—dis 20&10 %
Auger				"	"		6 50—dis 20&10 %
"				large	"		8 00—dis 20&10 %
Patent Auger, Ives'							dis 25&10 %
" Douglass'						per set	$1 25—dis 10 %
" Swan's						per set	$1 00—dis 20&10 %

Hangers.
Barn Door dis 65&10 %
"Anti-Friction" No. 1, $1·25; No. 2, $1·50 ₩ pr. dis 30&5 %
Noverity dis 30 %
Challenge dis 40 %

Harness Snaps.
Henshaw's dis 25&10 %
Judd's dis 40 %
Fitch's (Brastol) dis 30 %
Hotchkiss' dis 10 %
Andrews' dis 25 %
Sargent's dis 50&10 %
New York Wire dis 2·&20 %

Hatchets.—Isaian Blood dis 15 %

Shingling, Nos.	1	2	3			
	₩ doz	$1·25	8 00	8 75		
Claw, "	₩ doz	7 75	8 50	9 25		
Lathing, "	₩ doz	7 50	8 00	8 50		
Hunt's						dis 15 %
Shingling, Nos.	1	2	3			
	₩ doz	$7 25	8 00	8 75		
Claw, "	₩ doz	7 75	8 50	9 25		
Lathing, "	₩ doz	7 50	8 25	9 00		
Hurd's						dis 30 %
Shingling, Nos.	1	2	3			
	₩ doz	$8 00	8 50	9 00		
Claw, "	₩ doz	9 00	9 50	10 00		
Lathing, "	₩ doz	8 00	8 50	9 00		
Newark's Edge Tool Co.'s						dis 25 %
Shingling, Nos.	1	2	3			
	₩ doz	$6 50	7 00	7 50		
Claw, "	₩ doz	7 25	7 75	8 25		
Lathing, "	₩ doz	6 50	7 00	7 50		
Yerkes & Plumb						dis 20 %
Shingling, Nos.	1	2	3			
	₩ doz	$7 00	7 50	8 00		
Claw, "	₩ doz	7 50	8 00	8 50		
Lathing, "	₩ doz	7 00	7 50	8 00		
Simmon's						dis 15 %
Shingling, Nos.	0	1	2	3		
	₩ doz	$7 50	8 00	8 50	9 00	
Claw, "	₩ doz		9 00	9 50	10 00	
Lathing, "	₩ doz		8 00	8 50	9 00	
Broad, "	₩ doz		9 00	10 00	12 00	
" "	4 5 6	₩ doz	14 00	16 00	18 00	
" "	7 8	₩ doz	20 00	22 00		
Elephant						dis 30 %
Shingling, Nos.	1	2	3			
	₩ doz	$8 00	8 50	9 00		
Claw, "	1	2	3			
	₩ doz	9 00	9 50	10 00		
Lathing, "	1	2	3			
	₩ doz	8 00	8 50	9 00		
J. F. Verree & Co.						dis 5 %
Shingling, Nos.	1	2	3			
	₩ doz	$7 00	7 50	8 00		
Clw. "	1	2	3			
	₩ doz	7 50	8 00	8 50		
Lathing, "	1	2	3			
	₩ doz	7 00	7 50	8 00		
Underhill's						dis 10 %
Shingling, Nos.	1	2	3			
	₩ doz	7 25	8 00	8 75		
Claw, "	1	2	3			
	₩ doz	7 75	8 50	9 25		
Lathing, "	1	2	3			
	₩ doz	12 00	11 00	12 00		

M. H. Jones & Co.						dis 25 %
Shingling, Nos.	1	2	3			
	₩ doz	$8 00	8 50	9 00		
Claw, "	1	2	3			
	₩ doz	7 00	8 00	9 00		
Lathing, "	1	2	3			
	₩ doz	8 00	8 50	9 00		

Hay Knives.—"Lightning" per doz $20·00 net

Hinges.
Gate, Western ₩ doz $6·25—dis 60&10 %
" N. E. ₩ doz 11·25—dis 6 &10&10 %
" N. Y. State ₩ doz 7·20—dis 60&10 %
Rolled Plate dis 65&10 %
" Raised dis 65&10 %
Wrought Strap and T dis 30 %
Providence Plate { 6 and 8 in. 11c ₩ lb / over 8 in. 9½c ₩ lb } dis 30 %
Screw Hook and Strap { 8, 10, 12 in. 6¼c / 14 to 36 in 5¼c } net
Heavy Welded Hook { ⅜ to 1½ in., 6¼c / 1¼ in & up, 6c } net
Screw Hook and Eye { ⅜ to 1 in., 8¼c / ⅜ in. 9¼c / ½ in. 11¼c } net

Hoes.
Solid Shank, C. S. ₩ doz $8 00—dis 35 %
Socket ₩ doz 9 00—dis 35 %
Riveted Eye ₩ doz 5 00—dis 35 %
Grub dis 25 %
Planters net @ dis 5 %
Scovill net @ dis 5 %
Scovill Pattern net @ dis 5 %
Lane & C. E. Cresent, American Pattern list net
" " Scovil Pattern add 10 %

Hooks.
Bird Cage dis 60&10 @ 70&10 %
Cotton dis 50 %
Belt dis 5· @ 60 %
Bench—Hotchkiss' $5 00 ₩ doz dis 10 %
" Weston's No. 1, $8·00; No. 2, $7·00 per doz net
" McGill's $8 00 per doz, dis 10 %
" Skinner's per doz $6·25, dis 2·%
Clothes Line, Harness, Wardrobe, Hat and Coat, Ceiling } Hart's list dis 60&10&10 %
" Sargent's list dis 6 &5&10 %
" Reading list dis 35&10 %
Wrought Staples and Hooks and Staples dis 70&10 %
Wire Screw Hooks and Eyes dis 65&10&10 %
Grass dis 2·%
Whiffletree—Patent dis 33½ %
Hooks and Eyes—Malleable Iron dis 60&10&10 %
" " Brass dis 60&10&10 %

Horse Nails.

Nos.	5	6	7	8	9	10
American Pressed ₩ lb	22c	20c	20c	20c	20c	20c
Ausable "	30c	27c	25c	24c	23c	22c
" P'd & Pol'd "	31c	28c	26c	24c	24c	23c
" & Blued "	32c	29c	27c	26c	25c	24c
Cortland "	32c	29c	26c	25c	22c	21c
Buffalo Forged "	31c	28c	26c	25c	24c	23c
Globe, P't'd & Pol'd "	31c	28c	26c	25c	24c	23c
National, Pointed and Polished, Pat. Fin "	29c	25c	23c	24c	21c	20c
National, Pointed and Polished, Ex. Fin "	30c	27c	25c	24c	23c	22c
Perkins' Pointed and Polished "	30c	27c	25c	24c	23c	21c
Perkins' Pointed and Blued "	31c	28c	26c	25c	24c	23c
Putnam "	32c	28c	26c	25c	24c	23c
Vulcan, P't'd & Blued "	33c	30c	28c	27c	26c	25c

Star brand, 16c.; Morgan 14c
Putnam 20.0 lbs., dis 5 %
Ausable, Am. Pressed, Perkins, Globe.
National and New London 1000 lbs., d's 5 %
Vulcan 1000 lbs., dis 7½ %
Vulcan and Brunsage

Shears and Scissors.
Cast Steel.....dis 75&10 %
Cast Iron.....New list July 15.....dis 30 %
Heinisch Sons' Trimmers and Scissors.....dis 65 %
" " Standard quality Shears and Trimmers.....dis 40 %
Seymour's Straight Trimmers.....dis 60&10 %
" " Scissors.....dis 50 %
Pruning.....per doz $10 00—dis 35 %
Barnard's Lamp Trimmers.....per doz $8 75
Sheaves.
Sliding Door, M. W. & Co. list.....dis 40&5&2 %
" R. & E. list.....dis 5&2&2 %
" Patent Roller.....dis 25 %
" " Hatfield's.....dis 50 %
" Russell's Anti-Friction.....dis 50&2 %
Sliding Shutter, R. & E. List.....dis 50&5&2 %
Shovels and Spades.
Ames.....dis 20 %
Birmingham Shovel Co.....dis 15 %
Rowland's.....dis 25 %
Old Colony.....new list dis 10&5 %
Middleboro' Shovel Co.....new list dis 20 %
C. E. Jennings & Co.....New list dis 30&10 %
Dunning & Shovels and Scoops.....dis 20&7½ %
Shovels and Tongs.
Iron and Brass Head, L. & E. list.....dis 50&10&2 %
" " Hart's.....dis 55&2&10 %
Polished Steel.....dis 50&10&2 %
Skates.
Barney & Berry's
N. Y. Club.....per pair $2 75
B. & B. Club....." 3 50
All Clamp....." 4 25
Rink....." 5 00
Florence Steel.....$1 00 dis 25 %
" Spring.....3 00 dis 30 %
" All Clamp.....3 50 dis 30 %
Peck & Snyder's—
No. 1, Blued.....per pair $5 00
No. 2, Nickel Plated.....per pair 6 00
No. 3, " " extra..per pair 8 00
Clipper Club Blued.....per pair 3 50 dis...25 %
" " Full Pol'd....per pair 4 50
" " " and Nickel Plated.....per pair 6 00
Acme Club Skates.—Nos. 5 7 10 12 14
Pair $4 00 5 00 7 00 7 50 8 00 dis 20 %
Slates.
Square Frames, Round Cornered, by case.....dis 65&10 %
Less than a case.....dis 65 %
Spoke Shaves.
Iron.....dis 33⅓&10 %
Wood.....dis 30 %
Bailey's.....dis 20&10 %
Spoke Shave Irons.
Spear & Jackson's.....$5 00 to £ gold
Spoons.
Tinned Iron.....dis 10 %
By the case.....dis 30 %
Basting.....dis 10 %
Britannia.....62 50&5 @ 55 %
" Boardman's, new list.....dis 55 %
Rogers & Bro., A 1.....dis 50 %
Derby Silver Co.....dis 50 & 5 %
Holmes, Booth & Haydens.....dis 50 %
Nickel Silver Co.....dis 40 %
German Silver.....dis 30 @ 33⅓ %
Tin (P. S. & W.)—
Teas.....$1 50 ₩ gross, net
Tables.....2 75 " net
Stocks and Dies......dis 5&10 %
Stone.
Hindostan Stone.....₩ ℔ 6c
" Axe Stone.....₩ ℔ 8c } dis 20&10 %
" Slips.....₩ ℔ 10c
Sand Stone.....₩ ℔ 6c—dis 20&10 %
Washita Stone.....No. 1, ₩ ℔ 30c net
" No. 2, ₩ ℔ 25c net
" Slips.....No. 1, ₩ ℔ 60c net
Arkansas Stone.....No. 1, ₩ ℔ $1 35 net
" Slips.....No. 1, ₩ ℔ $2 50 net
Grindstones. Family, J. F. Green & Bro.....dis 50 %
" " Loring's.....dis 10 %
Stove Polish.
Joseph Dixon's.....₩ gross, 6 00
Gem.....₩ gross $4 25 or 4 50 net
Gold Medal.....₩ gross $6 00 dis 25 %
Rising Sun.....per gross $5 75 net
Squares.
Steel.....dis 50 %; full cases, dis 50&10 %
Iron.....dis 50 %; full cases, dis 50&10 %
Nickel Plated.....add $2 50 @ $4 00 ₩ doz net
Try Squares and T Bevels.....dis 45&10 %
Star Try Squares and Bevels.....dis 30 %
Disston's Try Squares No. 1.....dis 20 %
" " No. 2.....dis 40 %
" " Improved.....dis 20 %
Tacks.
Full Weight American Iron.....dis 45&7½ %
Half Weight American Iron.....dis 72½&7½ %
Carpet.....dis 7½ %
Brads American Half Weight.....dis 50&7½ %
Finishing Nails.....⅜ ½ ⅝ 1 1¼ in. and over
₩ ℔.....22c 20c 18c 14c 13c dis 7½ %
Trunk and Clout.....⅜ ½ ⅝ 1 1¼ in. and over
₩ ℔.....22c 20c 18c 14c 12c dis 7½ %
Copper Tacks.....₩ ℔ 50c—dis 7½ %
Iron Shoe Nails, ₩ ℔ 4-8 and longer, 9½c; 3⅜-8, 10c.....dis 7½ %
Double Pointed.....dis 33⅓&10 %
Tapes, Measuring.
American Flask and Cap Co.....dis 20 %
Eddy's.....dis 20 %
Tea Trays.
American Tea Tray Co.....dis 15 %
Thermometers.
Tin Case.....dis 50&10 %
Toe Calks.
Winsted.....₩ ℔ 13c., dis 10 %
Tobacco Cutters.
Enterprise Mfg. Co. (Champion).....dis 20 %
Wood Bottom.....per doz $13—dis 25&10 %
All Iron.....per doz $10 50—dis 25&10 %
Tinners' Tools and Machines.
P. S. & W.....dis 10 %
Traps.
Game, Newhouse.....dis 25 %
" Peck, Stow & Wilcox.....dis 30 %
" Hotchkiss.....old list dis 30 %; new list dis 10 %
" Blake's Patent.....dis 50 %
Mouse, Wood Choker.....₩ doz holes. 15 @ 16c
" Patent Chocker Union Nut Co.....₩ doz holes 16 @ 18c net
" Round, Wire.....₩ doz $1 50 to 2 00 net
" Square, " .....₩ doz 2 00 to 2 50 net
" Cage, " .....₩ doz 2 50, dis 10 %
" Patent Self Setting.....per doz holes 25c net
Trowels.
Lothrop's Brick and Plastering.....dis 10 %
Disston's Brick and Plastering.....dis 12½ %
Rose's Brick.....dis 5 %
Brades' Brick.....gold. dis 10 %
Worrall's Brick and Plastering.....dis 20 %
Garden.....dis 25 %
Triers.
Butter and Cheese.....dis 25 %
Ventilators (Window).
Nickel and Gilt.....per dozen $16 00 @ 18 00
Vises.
Solid Box, Trenton...4 to 160 lbs., 16c.; 160 and over, 20c
" " Wilson's.....30 to 160 lbs., 18c } dis 25 %
160 and over, 22c }
" " Peter Wrights.....16c gold
Parallel, Parker's.....dis 2 %
" Wilson's.....dis 30&10 %
" Sargent's.....dis 55&10 %
" Trenton.....dis 15 %
" Backus and Union.....dis 25 %
" Merrill's.....dis 15 %
" Fisher & Norris.....dis 15&10 %
" Buffalo.....dis 25 %
" Stevens'.....dis 15 @ 20 %
Saw Filers, Bonney's.....per doz $20 00 dis 20 %
" Stearn's.....per doz $20 00 dis 20 %
" Hopkins'.....per doz $17 50 dis 10 %
Wheel Barrows.
Canal (Pugsley & Chapman).....new list dis 15 %
Coal, Garden and Stone (Pugsley & Chapman).....dis 25 %
Weil Wheels.
Revised list.....dis 60&10 %
Wire.
Brass and Copper.....List of Oct. 27, 1875, net
Bright and Annealed.....Nos. 0 @ 18 dis 45 @ 50 %
" " .....19 @ 26 dis 50 @ 55 %
" " .....27 @ 36 dis 55 @ 60 %
Coppered.....0 @ 18 dis 40 @ 45 %
Galvanized, Nos. 0 to 9.....₩ ℔ 8 @ 8½c net
Galvanized, Nos. 10 to 18.....market list dis 15 @ 20 %
Tinned.....dis 25 @ 30 %
Cast Steel.....dis 15 @ 20 %
Tinned Broom Wire.....dis 35 @ 40 %
Galvanized Telegraph, Nos. 8 and 9.....₩ ℔ 9c
Galvanized Telegraph. Nos. 10 and 11.....₩ ℔ 10c
" " 12.....₩ ℔ 10½c
Annealed Fence. Nos. 8 and 9.....dis 50 %
" Grape, " 10 to 14.....dis 30 %
Fence Staples.....₩ ℔ 7½ @ 8c
Stone' Steel Wire.....$7 00 to £ gold
Judd's Picture Wire.....dis 50 %
Clothes Line Wire.....per coil 60c. net
Wrenches.
American Adjustable.....dis 45 %
Baxter's Adjustable "S".....dis 30 %
" Diagonal.....dis 30 %
Collins & Co.'s.....dis 45 %
Coes' Genuine.....dis 40&10 %
" Pattern (Wrought).....dis 50&10 %
" " (Malleable).....dis 45&10 %
Diamond Hardware Co.....dis 40 %
Lindsay's Patent.....dis 25 %
Taft's Pattern.....dis 70&10 %
Davis Patent Duplex.....new list dis 25 %
Bemis & Call's Patent Combination.....dis 20&5 %
" " Derrick's Pattern.....dis 25&2½ %
" " Brigg's Patent.....dis 15&10 %
Aiken's Pocket (Bright).....per doz $10 00—dis 50&10 %

Wringers.

	Less than 2 doz	2 doz lots
Providence	₩ doz $7 50	$70 00
Reliance	₩ doz 6 00	67 00
Universal—Extra	₩ doz 7 50	70 00
Novelty	₩ doz 7 00	70 00
Sherman	₩ doz 7 50	70 00
Eureka	₩ doz 6 00	58 00
Wringers without Cog Wheel	₩ doz 6 00	58 00

TIN WARE AND TRIMMINGS.

STAMPED TIN WARE, dis 10 %.

COMMON STAMPED WARE, &c.

Bucket Covers.

Quarts	½	1	2	3	4
Inch	4¾	5 5-16	6 5-16	6¾	7 11-16
Per gross	$2 00	2 60	3 40	4 25	5 75
Quarts	6	8	10	12	
Inch	8⅝	9⅝	9⅝	10 9-16	
Per gross	$6 50	8 00	8 50	11 50	

Cake Box Covers.

Inch	11¼	12¼	13¼
Per gross	$13 00	14 00	22 00

Pot Covers.

Inch	7¼	8¼	8¾	9¼	9⅝	10¼
Per gross	$5 75	6 00	6 25	6 75	7 25	8 25
Inch	10¾	11¼	11¾	12¼	12⅝	13¼
Per gross	8 75	9 50	10 00	13 00	13 75	16 50

Pie, Dinner or Scolloped Plates.

Inch	6	7	8	9	10	11
Per gross	$4 00	4 50	5 50	5 50	8 50	10 50

Deep Pie Plates.

Inch	9	10
Per gross	$8 50	10 50

Jelly Cake Pans.

Inch	9	10
Per gross	$7 50	10 00

Coffee Pot Covers.

Plain	1¾	2	3	4	5	6 qts.
Inch	3	3½	3¾	4½	5	5 50
Per gross	$1 15	1 40	1 60	2 00	2 75	3 00
Rimmed	2¾	3	3¼	4	4½ inches.	
Per gross	$2 25	2 50	3 00	3 50	4 00	

T. K. Breasts only.

Inch	7¼	8	8½	9	9½	10	10½	1¼
Per gro.	$6 00	6 50	6 75	7 25	7 75	9 50	10 00	12 00	13 00

Grater Plates.

Sheet	½	1
Per gross	$3 00	6 00	11 50

Scolloped Cake Pans.

	Small.	Large.
Without Tubes	per gross, $8 00	11 50
With Tubes	" 10 50	14 00

Stamped Square Pans.

No.	½
Per gross	$7 50	14 50

Common Square Pans (One Sheet).

Per gross	$11 50

Milk Skimmers (Plain or Pierced).

Per gross	$4 00

Lettered Plates

Inch	5½	6
Per gross	$3 25	4 00

Steamer Bottoms.

Add $1 per gross, or 10c. per doz. to list of Pot Covers.

Tin Stove Pipe Rings.

Inch	4	4½	5	5½	6	7
Plain	per gro. $4 00	4 50	5 00	5 50	6 00	7 00
Jap'd or Burn'd	" 6 00	6 50	7 00	8 00	9 50	10 00

Coffee Boiler Lips.

	Small.	Large.
To Rivet	per gross, $0 80	1 10
To Solder	" 1 25	

STAMPED DEEP AND RETINNED WARE.

Discount 20&10 %.

Plain Stamped Water Dippers.

	½ pint.	Pint.	Quart.	quarts.	2½ quarts
Per doz	90	1 15	1 50	1 85	2 50

Retinned Milk Pans.

Qts	½	1	1½	2	3	4	5	6	8	10	12
₩ doz	1 20	1 50	1 75	2 00	2 25	3 15	3 50	3 85	4 75	5 25	5 75

Dipper Bowls, Plain Stamped—

Pints	½	1	Quarts	1	2	2½
Per doz	60	75	Per doz	1 00	1 25	1 75

Dipper Bowls Retinned—

Pints	½	1	Quarts	1	2	2½
Per doz	75	95	1 05	Per doz	1 40	1 75	2 25

Pans.

Dish Pans, Retinned Deep—

Quarts	7	8	10	14	17	21	30
Per doz	8 50	9 50	11 00	13 00	16 00	19 00	30 00

JAPANNED TIN WARE, dis 5 %.

Cannisters, Common	Pound	½	1	2	3
	Per gross	$10 50	15 00	24 00	30 00
Canisters, Hinged	Pound	1	1½	3	4
	Per gross	$19 00	25 00	32 00	37 00	42 00
Canisters, Square	Pound	2	4	6	8	14	16
	Per doz	$3 00	4 25	5 00	5 75	8 00	9 00

Candlesticks, Japanned	No.	1	2
	Per gross	$8 00	7 00

Cake Boxes, Round	per nest,	$9 25
" Square	per nest,	4 25

Chamber Pails, Japanned	2	3	4	5
Nos.				
Green, per doz	$8 00	9 00	11 00	13 00
Oak "	9 00	11 00	12 00	13 50

Dust Pans, Corrugated	per gross,	$22 00
Box Graters	per gross,	$9 75

Molasses Cups	Pint	½	1	2	4
	Per gross	$13 00	16 00	28 00	42 00

Lunch Boxes, per doz	7 in. $2 00; 8 in. $2 50
Pepper Boxes Japanned	₩ gross small, $3 00; large, $4 00
Toy Banks, House	No. 1	2
	Per gross $7 00	5 50
Toy Banks, Gothic	No. 1. $6 00, No. 2, 4 00 per gross
Toy Cups, Straight	No. 1	2	3
	Per gross $8 75	3 25	2 75
Toy Cups, Flaring	No. 1, $4 25; 2, $3 75 ₩ gross
Toy Pails, Covered	No. 1, per gross $4 00
Toy Rattles	per gross, $2 00
Trunks, Wire Handled	per nest (5) $1 75
Spittoons, Tin	per gross, $27

PLANISHED TIN WARE, dis 20 %

Tea Pot Handles—P. S. & W.....dis 20 %

Stow's Patent Hollow Tea Pot Handles.

No. 1, Small	4½ inches	per gross,	$11 50
No. 2, Medium,	5⅛ "	"	12 50
No. 3, Large,	6½ "	"	13 50
No. 4, Ex. Large	7¼ in., for Wash Pitchers &c.	"	18 00

Solid iron, Tin Tipped.

No. 10, Small,	4¾ inches	per gross,	$9 00
No. 15, Medium,	5½ "	"	9 50
No. 20, Large.	6½ "	"	10 75

Stow's Patent Hollow Tea Pot Handles, Adamantine Bronze—P. S. & W

No. 12, Bronzed and Tin-Tipped.....per gross, $13 50

Saucepan Handles. Of best Malleable iron.
P. S. & W.....dis 20 %

Japanned.

No. 1, 5¼ inches long	per gross,	$3 50
No. 2, 6 "	"	3 75
No. 3, 6½ "	"	4 00
No. 4, 7¼ "	"	4 25
No. 5, 8 "	"	4 50
No. 6, 9 "	"	4 75

Tinned.

No. 1, 5¼ inches long	per gross,	$4 25
No. 2, 6 "	"	4 50
No. 3, 6½ "	"	4 75
No. 4, 7¼ "	"	5 25
No. 5, 8 "	"	5 50
No. 6, 9 "	"	5 75
Japanned	per lb.,	16
Tinned	"	20

Iron Kettle Ears (P., S. & W.).....dis 45 %
Half gross pairs in a package.

Tinned

Nos.	1	2	3	4	5	6	7	8
Per gross pairs	85c	1 00	1 50	1 75	2 10	2 75	3 75	4 50

Black.

Nos.	1	2	3	4	5	6	7	8
Per gross pairs	75c	88c	$1 25	1 50	1 75	2 25	2 75	4 00

Tinned Tea Kettle Ears.

Nos.	4	5	6
Per gross pairs	$1 75	2 10	2 75

Extra Heavy Tinned Kettle Ears—French Pattern.

Nos.	1	2	3	4	5	6	7
Per gross pairs	$1 00	1 25	1 50	1 75	2 00	2 50	3 00

Malleable Iron Kettle Ears for Coal Hods, &c.
F., S. & W.....dis 20 %

No. 10 Small	₩ lb. Tinned 21c; Black, 16c
No. 20 Medium	₩ lb, " 20c, " 16c
No. 30 Large	₩ lb, " 20c; " 16c
No. 40 Extra Large	₩ lb, " 20c; " 16c

In cases of 100 lbs. each.

Milk Can or Boiler Handles—(P. S. & W.) 4½ in.	dis 25 %
Plain, &c.; Japn'd, 9c.; Tinned, 15c. per lb.; Malleable Clips or Ears to match, Tinned	30c per lb.
Toilet Ware Handles—4½ inches (P. S. & W.)	dis 35 %
Plain with drilled holes, per lb	9c
Plain with Cast "	8c
Plumbers' Scrapers—(P. S. & W.)	dis 25 %
Extra quality, length 6 in., per doz	$4 00

METALS.

IRON.—DUTY Bars, 1 to 1¼ cents per lb., Sheet, Band, Hoop and Scroll, 1¼ to 1¾ cents per lb. Provided, that none of the above Iron shall pay a less rate of duty than 35 per cent. Pig, $7 per ton; Polished Sheets, 3 cents per lb.; Wrought Scrap, $8 per ton; Cast Scrap, $6 per ton. Railroad, 70 cents per 100 lbs. Boiler and Plate, 1¼ cents per lb.

Pig Iron—AMERICAN.

Foundry No. 1	₩ ton,	$23 00 @
Foundry No. 2	"	21 00 @
Gray Forge	"	15 50 @ 20 00

SCOTCH.

Coltness	"	33 00
Glengarnock	"	31 00
Gartsherrie	"	32 50
Eglinton	"	29 50 @ 30 00
Summerlee	"	

Bar Iron.
Am. Renned, at mill.....2·4c. @ 2·5c

Rails.
American, at works, currency.....₩ ton 44 00 @ 46 00
Old Rails....." 22 50 @ 25 00

Scrap.
Wrought Scrap....." 30 00 @ 31 00

Bar Iron from Store.

Common Iron. ⅜ to 2 in. round and square.... to 6 in. x ⅜ to 1 in.	₩ ton	$57 50	
Renned Iron. ⅜ to 2 in round and square.... 1 to 6 in. x ⅜ to 1 in.	"	57 50 @	60 00
1 to 6 in. x ¼ and 5-16	"	62 50 @	65 00
Shafting Iron—4½ to 4 in	"	62 50 @	75 00
Rods—5-16 to ⅝ round and square	"	110 00 @	65 00
Bands	"	70 00 @	72 50
Hoops—⅝ to 2 in	"	130 00 @	80 00
Swedish Iron. Ordinary sizes	"	130 00 @	132 50
Plow size	"		

Sheet Iron.

	Common American and English.	R. G. American.	R. G. English.
Nos. 10 to 20	₩ ℔ 3⅝ @ 4c	5c	5½c
21 to 24	" 4c	5½c	5½c
25 to 26	" 4¼c	5½c	5½c
27	" 4¼c	5½c	6c
28	" 4½c	5c	6½c
Galvanized, 14 to 20, prime	₩ ℔ 8½c;	24 quality	₩ ℔ 7½c
" 21 to 24	" 9¼c	"	" 8¼c
" 25 to 26	" 10 c	"	" 9 c
" 27	" 10½c	"	" 9½c
" 28	" 11½c	"	" 10½c

Patent Polished	₩ ℔ 14c
Russia, Nos. 8 to 18	" 15½c
" Stained, No. 1	" 14½c
Belgian	" 10c

One-piece Corrugated Sheet Iron Elbows.

CHARCOAL IRON.

½	⅜	½	⅝	¾ inch.
$2 50	3 50	4 50	5 25	6 50 per doz.

1¼	1½	1¾	2 inch.
$5 00	7 00	9 50	12 00 14 00 per doz.

RUSSIA IRON.

½	⅝	¾	1 inch.
$5 00	7 00	9 50	12 00 14 00 per doz.

COPPER—DUTY. Pig, Bar and Ingot, 5c.; old copper, 4 cents ₩ ℔; Manufactured (including all articles of which copper is a component of chief value) 45 % ad valorem.
American Ingot.....₩ ℔ 23¾ @ 23¾c
English " .....

SHEATHING, BRAZIERS COPPER, BOLTS, &c.

Braziers Copper, ordinary sizes, over 16 oz., per square foot.....31c ₩ ℔
Braziers Copper, ordinary sizes, 16 oz. and over 12 oz., per square foot.....33c. "
Braziers' Copper, 12 oz. per square foot.....37c. "
Circles less than 24 inch in diameter.....34c ₩ ℔
Circles, 24 inch diameter and over.....37c. "
Segment and Pattern Sheets.....34c. "
Locomotive Fire Box Sheets.....31c. ₩ ℔
Sheathing Copper, over 12 oz. per sq. ft.....30c. "
" " 12 oz. ₩ sq. ft. and ughter.....35c. "
Bolt Copper.....31c. "
Copper Bottoms. 33c. ₩ ℔.....net
No Copper in Sheathing except 14x48 inches, and not to exceed 34 oz. to the square foot.

O'NEILL'S PATENT PLANISHED COPPER.

14x48.
14 and 16 oz. and heavier.....37c. By the case, 36c. ₩ ℔
12 oz. and lighter.....40c. " " 39c. "

Boiler Sizes.
7 in., 14x52. 8 in., 14x56. 9 in., 14x60
14 and 16 oz. and heavier.....39c. By the case, 38c. ₩ ℔
(And all sizes not over 20 inches wide.)

30x60
14 and 16 oz. and heavier.....41c. ₩ ℔
12 oz.....44c. "

TINNING.

14x48, by the case.....8c. ₩ sheet
14x48, less than case.....10c. "
Other sizes not larger than 30x60.....2½c. ₩ sq.
Larger than 30x60.....5c. "

Brass.

Brown & Sharp's Gauge the Standard except for Fine Wire.

BRASS MANUFACTURERS' PRICE LIST.
October 27th, 1875.

Net cash prices for Roll and Sheet Brass, Wire, &c., for quantities of 130 pounds and over at one time. For less than 100 pounds, three cents additional.

HIGH BRASS

All Nos. to No. 28, and widths 14 in. and under.....27c
All Nos. to No. 28, inclusive, and widths over 14 to 20 in., inclusive.....30c
Over 20 in. to 30 in., inclusive.....33c
½c. ₩ ℔ advance on each No. above Nos. 28 to 38, inclusive.
All Brass thinner than No. 38 is Platers' Brass, at.....45c
Sheets 24x48 in. and all sheets cut to particular sizes and lengths.....33c
Printers' Rules.....40c
Sheets wider than 30 in. and under 40 in.....40c
" " " 40 in. and over.....42c
Circular sheets, in diam. from 4 in. to 14 inclusive....37c
" " " over 14 " 20, " 40c
" " " " 20 " 30, " 43c
" " " " 30 " 40, " 46c
" " " " 40 in.....49c

LOW BRASS.

Four cents ₩ ℔ more than High Brass.
Gilding Metal, 7c, ₩ ℔ more than High Brass.

Platers' or Gold Metal	In Bars	49c
	Sawed	45c
	Planed or Polished	48c

FOR SLITTING.

Metal, in width 2 in. to ⅛ in. to No. 30, inclusive, 1c. per ℔. advance.
Metal, in width 2 in. to 1 in., thinner than No. 30, 2c. per ℔. advance.
Metal, in width 1 in. to ⅛ thinner than No. 30, 3c. per ℔. advance.
Metal, in width ⅛ in. to ¼, to No. 30, 2c. per ℔. advance.
Metal, in width ⅛ in. to ¼ thinner than No. 30, 5c. advance.
Metal, ¼ in. in width and less, 10c. per lb. advance

GERMAN SILVER MARKET METAL AND WIRE

	Market Metal.	Wire.
4 per cent., 12 in., to No. 26	$0 60	$0 80
6 " " "	70	90
10 " " "	80	1 10
15 " " "	1 00	1 30
18 " " "	1 10	1 50
20 " " "	1 20	

German Silver Sheets over 12 in. wide, and weighing more than 16 lbs., $2 per ℔., net.
Advance 2c. for each additional in., in width above 12 in., and 2c. per ℔. on each No. thinner than Nos. 26 to 36 inclusive.
All German Silver thinner than No. 36 is Platers', at 50c. per ℔. additional.
German Silver Scrap one-third less than net price of 12 in. Market Metal. German Silver Turnings, Filings and Chips, half the price of Scrap.

BRASS AND COPPER WIRE.

	High Brass.	Low Brass.	Gild'g and Cop'r.
Nos. 0 to 20	0·30	0·34	0·40
Nos. 21, 22, 23	0·31	0·35	0·42
Nos. 24 and 25	0·32	0·36	0·43
Brass Rods, No. 8 and larger	0·36	0·40	0·46
Wire straightened and cut, smaller than No. 8	0·40	0·44	0·50

Fancy Wire not less than 4 cents per pound advance of Round Wire.
Spring Wire, 2 cts. per lb. advance.

FINE WIRE, BY THE OLD ENGLISH FINE WIRE GAUGE.

	High Brass.	Low Brass.	Gild'g and Cop'r.
No. 26	0·41	0·45	0·51
No. 27	0·44	0·48	0·54
No. 28	0·46	0·50	0·56
No. 29	0·48	0·52	0·58
No. 30	0·50	0·54	0·62
No. 31	0·52	0·56	0·66
No. 32	0·56	0·60	0·71
No. 33	0·60	0·64	0·81
No. 34	0·64	0·68	0·91
No. 35	0·69	0·73	1·03
No. 36	0·78	0·82	1·15
No. 37	0·98	0·91	1·28
No. 38	1·28	1·28	1·58

Ten cents per pound extra for Spooling.

TUBING.

	₩ ℔
Plain to No. 20 inclusive, above ⅜ in. to 1½ in.	$ 44
" 1½ to 3 in. inclusive	38
" above 3 in	50

Nos. 21, 22, 23, two cents advance on List for each Number.
Nos. 24, 25, 26, four cents advance on List for each Number.
Above No. 26, special rates.

Plain ¾ inch	50
" 5-16 "	60
" ½ "	80
" 5-16 "	1 30
" ¾ "	1 60

All Mandrel Drawn Tubes, 5 cents advance on List Prices.
Fancy Tubing, 4 cents advance on List above Plain.
English, Scotch and Extra Patterns Fancy Tubing to No. 20, 9 cents above Plain.
Tubing Sawed or Cut 2 to 4 feet long, 2 cents advance on List.
Add to 2 cents ⅛ cent for each additional cutting under two feet.
All Mandrel Drawn Tubes under ⅜ in., 25 cents per pound advance.

ZINC TUBING.

Plain	28
Fancy	31
Scotch and Extra Patterns	34

GERMAN SILVER TUBING.

4 Per cent.	85
6 "	95
9 "	1 10
12 "	1 25
15 "	1 40
16 "	1 45
18 "	1 55
20 "	1 65

MISCELLANEOUS.

Common Plain Brass Pail Ears	39
Hose Pipes, 500 and over	71
" under 500	76
Door Rail	60

SCRAP.

High Brass Scrap, 16 cents.
Low " 18 cents.
Gilding, 20 cents.
Turnings, Filings and Chips, half the price of Scrap.

Orders for Goods on this list received on or after this date, will be filled at the rate herein stated.
Terms—Net cash. No discount allowed. Interest to be added after thirty days.

ANTIMONY	14½c. gold
LEAD—DUTY: Pig $4 per 100 lbs.; old Lead, 1½ cent per lb.; Pipe and Sheet, 2½ cents per lb.	
Spanish	7c gold
German Refined	6½c gold
English	6¾ @ 7c gold
American	6 @ 6¼c gold
Bar	dis 10 %	8¾c.
Pipe	dis 10 %	9¼c.
Tin Lined Pipe	dis 10 %	16½c.
Sheet	dis 10 %	9¼c.
Shot	dis 10 % Drop, 9¼c.	Buck. 10¼c.

BABBITT METAL.

N. P. U	₩ ℔ 8¾ @ 9c
A., 23c.; B, 20c.; C, 15c.; D, 12c.	₩ ℔.
SOLDER	No. 1, 15c.; No. 2, 14c

STEEL—DUTY: Bars, Ingots, Sheets and Coils, valued at 7 cents per lb., or under, 2¼ cents; over 7 cents, and not above 11, 3 cents per lb. over 11, 3¾ cents per lb. and 10 % ad val. Railway Bars 1¼ cents per lb. Railway Bars, in part Steel, 1 cent per lb. Provided, that Metal cemented, cast or made from Iron by the Bessemer or pneumatic process, of whatever form or description, shall be classed as

American Cast Steel.

Tool	15 @ 16c
Spring	10c
Homogeneous	12½c
Tire	12½ @ 13½c

Machinery (round and square)	10 @ 11c
File	11c
Sheet	14 @ 16c
Saw Plate, mill and mulay	14 @ 16½c
Saw Plate, gang and X cut	13 @ 14c
" circular as to size	18 @ 30c

Chrome Steel.

Tool	₩ ℔ 20 @ 21c
Tool, extra fine	" 40 @ 75c
Spring	₩ ℔ 12c and upward
Machinery	₩ ℔ 11c
Hammer	" 15c.
Gun or Homogeneous	" 16c

English Steel.—payable in gold, net.

Best Cast	₩ ℔ 17½c
Extra Cast	" 15½c
Round Machinery, Cast	₩ ℔ 10¼ @ 11½c
Swaged, Cast	" 19½c
Best Double Shear	" 17½c
Blister, 1st quality	" 14½c
" 2d quality	" 12 c
German Steel, Best	" 11½c
do 2d quality	" 10½c
3d quality	" 9 c
Sheet Cast Steel, 1st quality	" 15½c
" " 2d quality	" 14½c
" " 3d quality	" 12½c
File Steel, Flat and ½ Round	" 12½c
" Square and Round	" 13½c
" Mill	13½c
" Taper to 4 inch	16c
" Taper 3 and 3¼ inch	18c

SPELTER—DUTY: In Pigs, Bars and Plates, $1 50 per 100 lbs.

Silesian, cash	6¼ @ 7c., gold
American "	7¼ @ 11c., currency

TIN—DUTY: Plates, Sheets, Tagger and Terne, 1·1c per lb.; Electro-galvanized Plates, 2 cents per ℔; Manufactures of, not enumerated, 35 per cent. ad val. Bars, Block and Pigs, free. Banca, subject to duty of 10 per cent.

Banca	₩ ℔ 23½ @ 24c., gold
Straits	₩ ℔ 19½ & 19¾c., gold
English	₩ ℔ 19¼ @ 19½c., gold

TIN PLATES, CURRENCY PRICES.

I C 10x14, Prime Charcoal			8 75
12x12, "			9 25
14x20, "			9 50
I X 10x14, "			11 00
12x12, "			11 50
14x20, "			12 00
D C 12¼x17 "			8 25
D X 12¼x17 "			10 50
For each additional X add			2 25

CORE TIN PLATE.

	Best.	2d Quality.	Ordinary.

Steel.

THREE CLASS PRIZE MEDALS. CLASSES 1, 21, 22, Great Exhibition of Industry LONDON, 1851.

MEDAL OF HONOUR, SOCIETY OF ARTS & INDUSTRY, LONDON, 1856.

1st CLASS PRIZE MEDAL, CLASS 18 UNIVERSAL EXHIBITION OF INDUSTRY PARIS, 1855.

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SUCCESSORS TO

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CAST, SHEAR, SHEET AND BLISTEB STEEL, OF EVERY DESCRIPTION.

BEST CAST STEEL WIRE, ADAPTED SPECIALLY FOR MECHANICAL PURPOSES; Also for ROPES, NEEDLES, FISH HOOKS, PINS, CRINOLINE, &c.

BEST CAST STEEL FILES, SAWS, EDGE TOOLS, HACKLES, GILLS, CARD CLOTHING, CARD TEETH, HACKLE AND GILL PINS, FISH HOOKS, NEEDLES, &c.

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PHILADELPHIA, Jas. C. Hand & Co.....PROVIDENCE, Nightingale & Kilton.

CHICAGO, Crerar, Adams & Co.....NEW ORLEANS, Folger & Co.

CINCINNATI, Augustus Wessel.....SAN FRANCISCO, Huntington, Hopkins & Co.

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Cast Steel Hammers and Sledges. Also, "M. & G." Anvils and Vises.

WARRANTED CAST STEEL, especially adapted for DIES and TURNING TOOLS, DRILLS, COLD CHISELS, PUNCHES and all kinds of MACHINISTS' TOOLS.

Celebrated Improved Mild Centre Cast Steel, for Taps, Reamers, and Milling Tools, Warranted not to crack in hardening Taps of any size.

Swede Spring Steel, especially adapted to Locomotive and Railway Car Springs. English Spring and Plow Plate Steel. Also, manufacturer of

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"JENKS" SPRING STEEL, "MINERVA" SWEDES, AND "ANGLO" CAST SPRING STEEL;

"JENKS" TIRE, TOE CORK, SLEIGH SHOE, BLISTER, AND PLOW STEEL;

ALSO,

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For Tools, Cutlery, Saws, Files, Augers, Gimblets, &c.; Sheet Cast Steel for SPRINGS AND STAMPING COLD;

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DOG BRAND FILES,

Unsurpassed, if equaled in quality.

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DARNALL WORKS, ATTERCLIFFE FORGE, } SHEFFIELD, ENGLAND.

Sole Manufacturers of the CELEBRATED

CAST STEEL,

Warranted most SUPERIOR and UNSURPASSED for

TOOLS and GRANITE ROCK DRILLS.

A full assortment of this universally approved OLD BRAND of English Steel, and

ARMITAGE'S GENUINE MOUSEHOLE ANVILS,

For Sale by

EDWARD FRITH, 16 Cliff Street, New York.

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Manufacturers of all Descriptions of Steel.

Manufacturers of Every Kind of Steel Wire.

Don Works, Sheffield, England.

JOHN HOGAN, Agent.

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In Bars, Sheets and Coils, for fine Pen and Pocket Cutlery, Table, Carving, Butcher and Shoe Knives, Turning Tools, Dies, Files, Clock or other Springs, Saws and Tools of every variety.

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In calling the attention of consumers of Steel in any of the parcticulars above enumerated, we would respectfully assure them of our ability to supply an article that cannot be excelled in quality, temper, and adaptation in all respects to the various purposes for which it may be required. Half a century of practical experience in all departments of Steel manufacture, a long established reputation in England, and the Continent of Europe, and in the Eastern States principally of this Country, encourage us to solicit a universal trial of our Steel for the above or other purposes for which a first class material in quality, temper, and durability is needed.

G. SANDERSON & CO.,

Manufacturers of all descriptions of

STEEL.

Bailey Street and Broad Lane Steel Works, } SHEFFIELD, ENGLAND.

Particular attention is paid to quality and temper for

Files, Saws, Table and Pocket Cutlery, Augers, Shovels, &c.

ALSO STEEL of superior quality for Turning Tools, Taps, Dies, Drills, &c.

Hot and Cold Rolled Sheets for Clock Springs, Corset Clasps, Pens, &c.

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STEEL FORGINGS UP TO 8000 lbs. IN WEIGHT.

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BEST TOOL, MACHINERY AND SPRING STEELS.

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SAW PLATES,

All descriptions of **Cast and German**

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Elliptic and Side Springs, Seat Springs.

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THE MOST POPULAR POWDER IN USE.

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Invite the attention of the Hardware Trade to their facilities for delivering

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The superiority is well known of our brands of Sporting Powder.

Orange Rifle, Orange Ducking, Orange Lightning.

ELECTRIC BLASTING APPARATUS.

SAFETY-FUSE at wholesale.

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Have a job lot of No. 2

CAST STEEL POLISHED SHOVELS

Cheap. A quantity of N. Y. Tap & Die Co.'s goods at a sacrifice.

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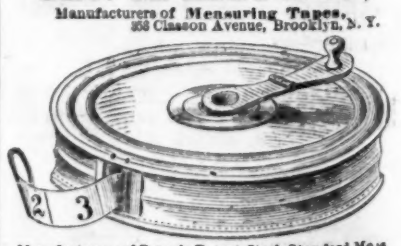
Manufacturers of **Measuring Tapes,**

358 Classon Avenue, Brooklyn, N. Y.



Manufacturers of Paine's Patent Steel Standard Measuring Tapes, for Surveyors, Engineers and Mechanics requiring a correct measure of great length according to U. S. Standard. Also of Tape measures for the same trades, Lumbermen, Machinists, Tailors, Shoemakers, Dressmakers &c. Catalogues on application.

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PARTICULAR ATTENTION PAID TO THE MANUFACTURE OF STEEL FOR

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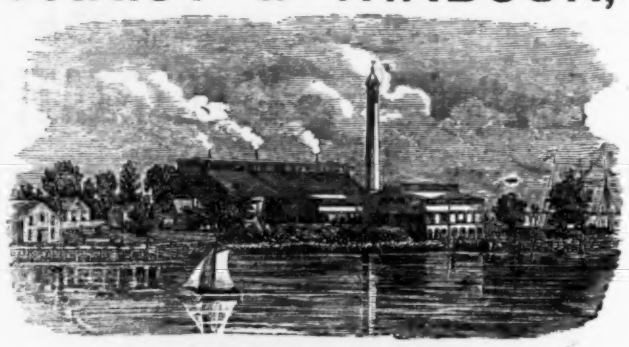
FARIST & WINDSOR,

BRIDGEPORT, CT., 1872.



WINDSOR LOCKS, CT., 1860.

ALL DESCRIPTIONS OF

CAST STEEL

made to order for **Cutlery, Dies, Agricultural Implements. Decarbonized Steel, Frog Plates and Points, Steel Forgings to Pattern.** Quality equal to the best. Prices as low as the market admits.

JOEL FARIST. JOHN B. WINDSOR.

LABELLE STEEL WORKS.

SMITH, SUTTON & CO.,

MANUFACTURERS OF ALL KINDS OF

STEEL.

Also, Springs, Axles Rake Teeth, &c.

OFFICE & WORKS, Ridge, Lighthill & Belmont Sts., & Ohio River, Allegheny.

Post Office Address, Pittsburgh, Pa,

D. G. GAUTIER & CO.,

MANUFACTURERS OF

Hammered and Rolled STEEL of every description

JERSEY CITY, NEW JERSEY.

DUDLEY G. GAUTIER. JOSIAH H. GAUTIER.

ALBANY & RENSSELAER IRON & STEEL CO.,

Troy, N. Y.,

Office in New York City, 56 BROADWAY.

MANUFACTURERS OF

Bessemer Railway Steel,

MERCHANT BARS, TIRE AND SHAFTING,

Railroad Iron, Pig Iron, Merchant and Ship Iron,

AGENCIES IN BOSTON AND PHILADELPHIA.

The Attention of Dealers is invited to the

EAGLE WASHER.

It embodies several important new features, a very complete arrangement of parts, and is faultless in construction. Send for descriptive circular and prices to the manufacturers.

OAKLEY & KEATING,
40 Cortlandt St., N. Y.

Clark's Patent Noiseless

Pressure Blowers and Exhaust Fans.

R. W. WILD, Agent,
20 Cortlandt St., New York

Portable and Stationary Engines, Boilers, Grist Mills, etc.

IXL

The Woman's Friend.

The Best Finished & Most Perfect

FLAT IRON ever made.

INTERCHANGEABLE HANDLE and SHIELD COMBINED.

Patented May 4, 1875

Set No. 1	3 Irons of 5, 6 and 7 lbs. 1 Handle	$2 00
" 2	3 " 6, 7 and 8 lbs. "	2 80
" 3	3 " 7, 8 and 9 lbs. "	2 80

Nickel Plated Irons.....75 cents extra.

Packed in cases of 12 sets or 36 irons. Send for Illustrated Circular.

BROOKLYN SAD IRON CO.,
85 First Street, Brooklyn, E. D., N. Y.

Hardware.

SPEAR & JACKSON,

Sheffield, England.

MANUFACTURERS OF

Saws, Files, Edge Tools & Steel.

JOHN L. FISHER, Agent,
100 Chambers Street, NEW YORK.

JOHN WILSON'S CELEBRATED

GRANTED A.D. 1766, BY THE CORPORATION OF CUTLERS OF SHEFFIELD, AND PROTECTED BY ACT OF PARLIAMENT.

BUTCHERS' KNIVES,
BUTCHERS' STEELS,
AND
SHOE KNIVES.

THE TRADE MARK, IN ADDITION TO THE NAME, IS STAMPED UPON EVERY ARTICLE MANUFACTURED BY

JOHN WILSON.

BUYERS ARE SPECIALLY CAUTIONED AGAINST IMITATIONS OF THE MARK, AND THE SUBSTITUTION OF COUNTERFEITS BEARING THE NAME, "WILSON," ONLY.

Works:—SYCAMORE STREET, SHEFFIELD. ESTABLISHED in the Year 1750.

ALFRED FIELD & CO.,

Hardware Commission Merchants,

IMPORTERS AND EXPORTERS.

Principal Offices and Warehouses:

Birmingham, Sheffield & Liverpool, Eng.; New York, U. S.; & Montreal, Canada.

A large line of Birmingham and Sheffield goods in stock at

93 Chambers and 75 Reade Streets, NEW YORK.

HERMANN BOKER & CO.,

OFFICES AND WAREHOUSES:

NEW YORK, 101 and 103 Duane and 91 and 93 Thomas Streets.
REMSCHEID and SOLINGEN (Prussia.) H. BOKER & Co.
SHEFFIELD (England), No. 3 Arundal Lane, Represented by Mr. ARTHUR LEE.
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Manufacturers and Importers of **Cutlery, Guns, Hardware** and **Railroad Material.**
Proprietors of **TRENTON VISE AND TOOL WORKS, Trenton, N. J.**—Vises, Picks, Mattocks, Grub Hoes, Sledges, Hammers, Bridge Work, Turn Tables, etc.
Proprietors of the **MANHATTAN CUTLERY CO.,** "O. K." Razors.
Sole Agents for **LAMSON & GOODNOW MFG. CO., Shelburne Falls, Mass.**—Table Cutlery and Butcher Knives.
W. & S. Butcher's Files, Edge Tools and Razors, the largest stock in the United States.
Geo. Wostenholm & Son's Knives, Scissors and Razors, the largest stock in the U. S.
John Wilson's Butcher and Shoe Knives.
Peter Wright's and Armitage Anvils.

We always have on hand a full assortment of

German and English Hardware, Cutlery, Guns, Gun Material, Chains, Heavy Goods.

REED & BARTON,

Manufacturers of **FINE**

Electro-Plated Table Ware

OF EVERY DESCRIPTION,

Would invite especial attention to the great variety of new and original designs of

Dinner, Tea and Water Sets, Epergnes, Cake and Fruit Dishes, Ice Pitchers, Vases, Mantel Ornaments, &c.,

SUITABLE FOR

BRIDAL & HOLIDAY PRESENTS.

Salesroom, No. 2 Maiden Lane, New York.

Factories, Taunton, Mass.

WESTON'S

Differential Pulley Blocks

Also known as

DOYLE'S, HALL'S AND BIRD'S

are now all merged and are controlled exclusively by

THE YALE LOCK MFG. CO.,

HENRY R. TOWNE, President, Stamford, Conn.

VAN WART & McCOY, New York Agents, 134 & 136 Duane Street.

T. A. WESTON, Mechanical Engineer, with the Company.

SOMETHING NEW!

"Zero" Stove Cover Lifter.

Patented July 27th, 1875.

Made in one piece from a superior quality of sheet iron, with a perforated cylindrical handle. Its superior advantages over any other style of cover lifter are manifest, as it will not break or bend, keeps always cool, and will fit any stove cover made. Send for Circular.

EAST RIVER SHEET METAL MFG. CO.,
SOLE MANUFACTURERS, 253 Pearl Street, New York

IVES, WOODRUFF AND CO.

MANUFACTURERS OF

Eagle Screw Clamps,

FINE

CARRIAGE MOUNTINGS

in Iron, Brass, Oroide, Silver and Gold.

SUPERIOR

Malleable Iron

Made under the

ANDREW'S PATENT PROCESS.

Mount Carmel, - - CONN.

BLACK LEAD Crucibles,

Manufactured by

ROBERT TAYLOR & CO.,

1900, 1902, 1904 & 1906 Callowhill St., PHILADELPHIA.

General Agents,

MERCHANT & CO., 507 Market Street, Phila.
PARK & CO., 122 Second Ave., Pittsburgh, Pa.

W. R. OSTRANDER,

Manufacturer of THE BEST IMPROVED

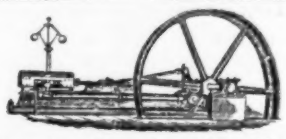
ALARM SPEAKING TUBE WHISTLE,

Speaking Tube, Elbows and Mouthpieces.

Send for new Trade List.

SPEAKING TUBES FITTED UP.

19 Ann Street. NEW YORK.



The Hartford Foundry & Machine Co

Successors to the

Woodruff & Beach Iron Works,

HARTFORD, CONN.

J. S. Hunter, Prest. E. J. Murphy, Treas. & Sec.

High and Low Pressure Marine & Stationary

STEAM ENGINES AND BOILERS,

Mining, Powder & Paper Mill Machinery.

And every variety of Iron and Composition Castings made to order.

The following are a portion of the Engines manufactured at these works, and are a sufficient guarantee of our capacity for doing first-class work, viz.: The Pumping Engines in the cities of Brooklyn, N. Y.; St. Louis Mo. and Hartford, Conn., and in the Charlestown, Mass. and Norfolk, Va., Navy Yards, and the engines in the U. S. Steam Sloops of War Michigan, Kearsage, Manitou, Minnetonka and Piscataqua and the Gun Boats Cayuga, Pequot and Nepsic, the Government Transports Dudley Buck and Geo. C. Collins, and the Steamships America and United States. Also the large Horizontal Engine for the new Plate Mill of the Bay State Iron Co.

Moore's Pat. Triple Acting

RATCHETS, DRILLS & WRENCHES.

Good as the Best.
Cheap as the Cheapest.

Price $5.00 to $18.00.

Foster's Combination BELT TOOL.

IMPROVED HAND VISE,

Patented Aug. 10, 1875.

Send for lists and discounts to

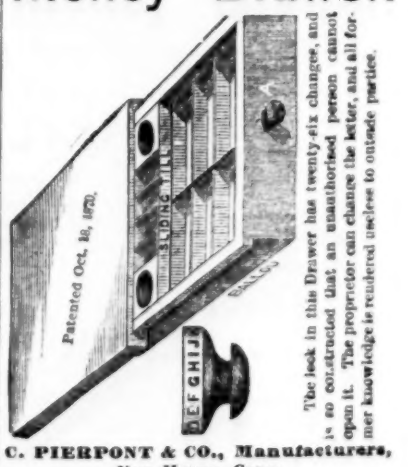
H. S. Manning & Co., New York.
Minot & Co., Boston.
S. T. Latham & Co., Philadelphia.
Jackson & Tyler, Baltimore.
Chas. Churchill & Co., London, Eng.

Manufacturers' Agents, or to

Lowell Wrench Co.,
Worcester, Mass.

EXCELSIOR

Money Drawer.



The lock in this Drawer has twenty-six changes, and is so constructed that an unauthorized person cannot open it. The proprietor can change the letter, and all former knowledge is rendered useless to outside parties.

C. PIERPONT & CO., Manufacturers,
New Haven, Conn.
Semple, Birge & Co., General Western Agents,
18 S. Main St., St. Louis, Mo.

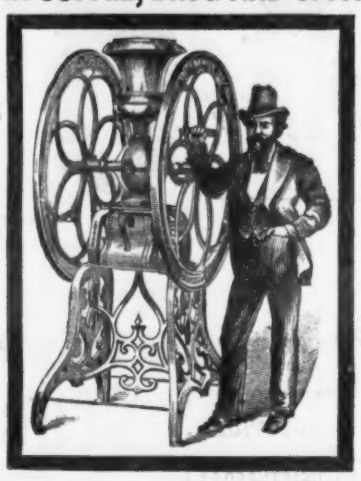
TWO SILVER MEDALS AWARDED

ENTERPRISE MANF'G CO. OF PA.

PHILADELPHIA,

FOR

AMERICAN COFFEE, DRUG AND SPICE MILLS.



Measuring Faucets

BUNG-HOLE BORERS,

TOBACCO CUTTERS

Cheese Cutters,

CORK PRESSERS

Etc., Etc.

GRAHAM & HAINES,

AGENTS,

88 Chambers St.

NEW-YORK.

NO EXTRA CHARGE FOR

NICKEL-PLATED HOPPERS WITH EAGLE DOME TOPS.

SEND FOR ILLUSTRATED CATALOGUE.

WHEELING HINGE CO.,

Wheeling, West Va.,

Manufacturers of

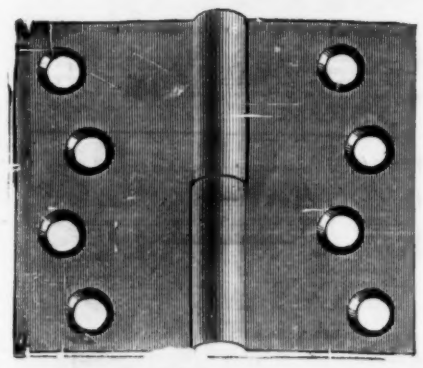
Wrought Butts, Strap & T Hinges, Wrought Hooks, Hasps & Staples, Wrought Repair Links & Washers,

GRAHAM & HAINES, Sole Agents, 88 Chambers Street, N. Y.

AMERICAN BUTT CO.,

PROVIDENCE, R. I., Manufacturers of

Cast Butt Hinges,



AND

BUILDERS'

HARDWARE.

New York Warehouse with

Messrs. GRAHAM & HAINES,

No. 88 Chambers Street.

Send for Price List.

QUACKENBUSH, TOWNSEND & CO.,

Hardware, Cutlery, &c.

59 & 61 Reade Street, N. Y.

Depot for

THOS. JOWITT & SONS,

(Sheffield, England,)

FILES and HORSE RASPS.

Rough & Ready

And

CLIPPER SCYTHES,

Warranted.

Manufacturers of the

CHALLENGE DOOR & GATE SPRING.

Patented March 4, 1873.

Agents for

Norwich Lock MFG. CO.

"BEAVER"

(American)

FILES and HORSE RASPS.

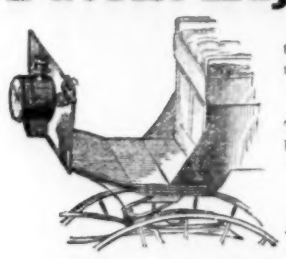
"WIDE AWAKE"

AXES.

BOUDREN'S

Patent Adjustable Dash-Lamp

FOR NIGHT DRIVING.



throws a powerful Light 100 feet ahead of the horse. Burns Kerosene without a chimney for 10 hours after one filling.

Fits any shaped Dash or on any vehicle. Splendid Barn Lantern;

Also good for Deer Hunting.

The light is not affected by wind, rain or jolting. No person should be without one.

Price $6, C. O. D., with privilege of examining. Address,

WHITE MFG. CO., Bridgeport, Conn.

A liberal discount to dealers. Send for Circular.

See illustrated article in *The Iron Age* of Oct. 14.

G. W. Bradley's Edge Tools.

Butchers' Cleavers,
Butchers' Choppers,
Axes and Hatchets,
Grub Hoes and Mattocks,
Mill Picks,
Box Chisels and Scrapers,
Ring Bush Hooks,
Axe Eye Bush Hooks,
Socket Bush Hooks,
Watt's Ship Carpenters' Tools,
Carpenters' Drawing Knives,
Coopers' and Turpentine Tools.

FOR SALE BY

N. WEED, 4 & 6 Gold St., N. Y.

SAMUEL LORING'S

PLYMOUTH TACK AND RIVET WORKS

PLYMOUTH, MASS., manufacturer of

TACKS, BRADS, NAILS AND

RIVETS.

Swedes and Common Iron Tacks; Leathered, Carpet Brush, Lace and Gimp Tacks; Finishing, Hungarian, 2d, 3d and 3d Fine, Trunk, Clout, and Cigar Box Nails; Black and Tinned Trunk Nails; Zinc, Iron, Copper and Steel Shoe Nails; Brads and Patent Brads; Glaziers' Points &c., &c., &c., COPPER, BRASS AND IRON RIVETS, of all kinds. Coopers' Rivets, from 1d to 6d, in casks of 100 lbs. each. Hose, Belt and Shoe Rivets and Burs. Oval and Countersunk Heads of extra lengths, made to order. SHIP AND BOILER RIVETS OF ALL SIZES AND LENGTHS

COBB & DREW,

Plymouth, Mass.

Manufacturers of Copper, Brass, and Iron Rivets · Common and Swedes Iron, Leathered, Carpet, Lace and Gimp Tacks; Finishing, Hungarian, Trunk Clout and Cigar Box Nails, &c. Rivets made to Order.

NEW YORK AGENCY

Grundy & Kenworthy

HARDWARE.

165 Greenwich Street.

Agent for the Philadelphia Star Carriage and Tire Bolts

FLUTING MACHINES.

The Celebrated K. F. M.

Manufactured for the Trade by

HENRY SOMMER,

8 to 12 Pearl Street, NEWARK, N. J.

Established in 1836.

Shelton Company,

Manufacturers of every variety of

TACKS & SMALL NAILS,

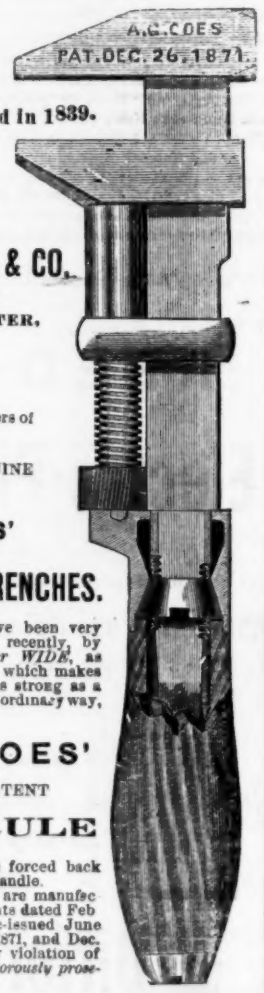
Carriage, Machine, Plow, Stove and Tire Bolts, Coach Screws, Bed Screws, &c.

BIRMINGHAM, CONN

It is the most convenient, durable, safe and reliable Snap ever used. It is easily operated with glove or mitten on. It has a brass coil spring that is four times as long as any other coil spring snap, which will neither rust nor be affected by cold, like steel springs in common use. It is enclosed in the barrel back of the bolt, making a snap which works freely under all circumstances, and without danger of having its parts broken or disarranged. We manufacture all sizes of Harness Snaps and Round Eye Snaps, and Covert's Patent Thimble to go on rope for Cattle and Horse Ties. Also other goods.

Send for price list and circulars.

HOLD BACK & SNAP CO., Troy, N.Y.



Established in 1839.

A. G. COES & CO.,

WORCESTER,

MASS.,

Manufacturers of

THE GENUINE

COES'

SCREW WRENCHES.

Our goods have been very much improved recently, by making the *Bar WIDE*, as shown in the cut, which makes a 12 in. Wrench as strong as a 15 in. made in the ordinary way, and by using

A. G. COES'

NEW PATENT

FERRULE

Which cannot be forced back into the handle.

☞ Our goods are manufactured under Patents dated February 7, 1860, (re-issued June 29, 1871), May 2, 1871, and Dec. 26, 1871, and any violation of either will be *vigorously prosecuted.*

We call particular attention to our new Patent Ferrule, with its Supporting Nut (shown in section in the above cut), which makes the strongest Ferrule fastening known.

A. G. COES & CO.

TUCKER & DORSEY,

MANUFACTURERS,

Indianapolis, Ind.

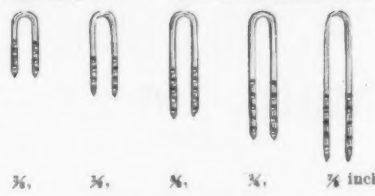
The Hart, Bliven & Mead Mfg. Co.,

18 & 20 Cliff Street, and 243 & 245 Pearl Street, New York.

Factories at KENSINGTON, CONN.

MANUFACTURERS OF

BUILDERS' HARDWARE.



Have constantly on hand a large stock of

Boardman's Blind Staples,

Packed 10 pounds in wooden boxes, or furnished in bulk in casks of 300 or 600 pounds.

Prices furnished upon application.

J. CLARK WILSON & CO.,

P. O. BOX 2355.

81 Beekman Street, New York.

Northampton Skate Co.,

SHEFFIELD STEEL CLUB SKATES.

THE BEST IN THE WORLD.

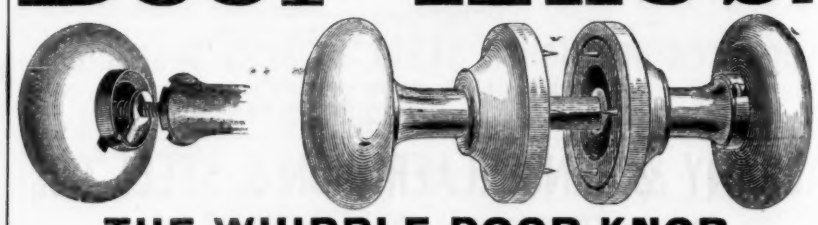
No Buckle to break. NO STRAPS to stop Circulation.

SELF-FASTENING.

FOR SALE BY ALL HARDWARE DEALERS.

WHIPPLE'S PATENT

Door Knob.



THE WHIPPLE DOOR KNOB

Is the only perfect Door Knob Attachment ever invented.

AWARDED A BRONZE MEDAL

At the American Institute Fair, in New York, for 1874.

NO SCREWS USED IN NECK OR ROSES.

Adjusts Perfectly to Doors of Different Thicknesses

WITHOUT THE USE OF RINGS.

The attention of Architects, Builders and Carpenters is specially desired. Circulars fully describing the advantages of this Knob, with Price List, sent on application to

The Parker & Whipple Co.,

WEST MERIDEN, CONN.,

Or 97 CHAMBERS STREET NEW YORK.

MALTBY, CURTISS & CO.,

Manufacturers of

CAPEWELL'S GIANT NAIL PULLER.

Also of

Metal Key, Rosewood & Maple Wood Faucets, Guaranteed to be Tight.

34 Reade Street, N. Y.

CAPEWELL'S LITTLE GIANT TACK HAMMER.

PHILADELPHIA.

(Corrected weekly by Lloyd, Supplee & Walton).

Terms, 30 days. For 60 or 90 days, interest added at 0 per cent. per annum.

Anvils.—Solid Cast Steel.....₩ ℔ 14c
Peter Wright's, (Advanced April 1st.) ₩ ℔, gold, 11½c
Wilkinson's..... " 11c
Eagle.....list 11 cents—dis 20 @ 20&10 %
Apple Parers.—Union.....per doz $7 00
Victor..... " 7 75
Domestic..... " 7 75
Reading..... " 7 75
Bay State Paring, Coring and Slicing..... " 15 00
" Peach Parers..... " 10 50
10 doz. lots 50c. per dozen discount.
Axes.—
Mann's (according to weights)..Per doz. $11 50 @ 10 00
Red Indian, " " " " " 11 50 @ 10 50
Red Cherrain, " " " " " 12 00 @ 11 00
Crown Prince " " " " " 12 00 @ 11 50
Hunt's " " " " " 12 50 @ 11 50
Augers and Auger Bits.—Pierce's Pat. Twist Bits.....dis 30 %
Douglass' & Ives' Bits.....dis 40&10 %
Connecticut Valley Auger Bits.....dis 40&10 %
Cook's Bits.....dis 40 10&10 %
Jennings' Bits.....dis 10 %
Bates' Nut Augers.....dis 40&10 %
Douglass' & Ives' Augers.....dis 40&10 %
Watrous' Ship Augers.....dis 10&15 %
Bonney's Pat. Hollow Augers.....dis 25 %
Stearns' Patent Hollow Augers.....dis 25 %
Balances.—
Landers, Frary & Clark's..... } Sold on Morton's new
Morton's..... } List.....dis 50 %
Chattillon's.....
Common Spring with Hook..... ₩ doz $1 38 @ 2 00
Bells.—Levin Bros. Mfg Co. Light Hand Bells.....dis 70 %
Common (Tissue Paper Weight).....dis 70&10 %
Swiss Pattern Hand Bells.....dis 50 %
Connell's Door Bells.....dis 50&5 @ 50&10 %
Gt. Western & Kentucky Cow.. dis 50&10 @ 50 10&5 %
Boring Machines.—Bates' Mfg. Co., complete with augers.....dis 20 @ 25 %
Douglas Mfg. Co., complete with augers..dis 20 @ 25 %
Common Boring Machines, no Augers.....$4 00 @ 5 75
Angular " " ..... 5 00 @ 4 75
Bolts.—Eastern Carriage Bolts .....dis 75 %
Western " " .....dis 75 %
Philadelphia " " .....dis 60 %
" Eagle, (Coleman's).....dis 60 %
Wrought Snutter, Stanley.....dis 50 @ 50&10 %
Braces.—Barber's.....dis 40&5 %
Packus.....dis50 %
Bartholomew's American Ball...dis 10&10 @ 15&10 %
Sconfard.....dis 50 %
Butts.—Cast Fast Joint, Narrow...dis 25&10 @ 30&10 %
" " Broad.....dis 35&10 @ 40&10 %
Cast Fast Loose Joint.....dis 45&10 @ 50&10 %
" Acorn, Loose Pin.....dis 40&10 @ 45&10 %
" Mayers & Parliament.....dis 35&10 @ 40&10 %
" Acorn Jap'd.....dis 45&10 @ 50&10 %
Wrought Loose Pin.....dis 35 %
" Table Hinges and Back Flaps.....dis 30 %
" Narrow.....dis 30 %
" Loose Joint.....dis 35 %
Parker's Blind Butts.... } Discount 65 %; by the case
Buffalo Hdw. Co." ... } 65&10%.
Clark's " " ... }
Shepard " ... }
Lull & Porter's (Phila.) Hinges....dis 60 %; case, 60&5 %
Garretson's No. 0 Hinges..... } 65&10 %
Cherrytree No. 0..... }
Chains.—German Halter.....dis 30 %
" Coil.....dis 30 %
Galvanized Pump..... net 13 @ 13½c
Best Proof Coil Chain—

₩ ℔	12½	9½	8¾	8¼	8	7¾	7c gold
	3-16	¼	5-16	⅜	7-16	½	⅝ in.

By the cask, 500 lbs., ½c per lb. less Common Chain, ¼c per lb. less.
Chisels.—Socket Framing.....dis 60 @ 60&10 %
Socket Firmer.....dis 60 @ 60&10 %
" Tang.....dis 40&10 @ 50 %
Beaty's Framing and Firmer.....dis 2 %
Casters.—Iron Bed.....dis 30&10 @ 40 %
Porcelain Wheel Bed.....dis 40&10 @ 50 %
Iron and Brass Wheel Plate.....dis 40 @ 10&10 %
Porcelain Wheel " .....dis 50 @ 50&10 %
Clothes Wringers.—Universal..... per doz $72 00
Novelty..... " 72 00
Discount on 2 dozen lots, $2 per dozen.
Coffee Mills.—Common Box and Side.....dis 15 %
Patent Box and Side.....dis 15 %
Cutlery.—American Pocket (best).....dis 25 %
Landers, Frary & Clark, J. Russell & Co. and Lamson & Goodnow Mfg. Co. Manufacturers' net prices
Drawing Knives.—Hart Mfg. Co.'s.....dis 60 %
Adjustable Handle.....dis 10 @ 15 %
Beatty.....dis 15 @ 20 %
Fry Pans.
Tinned.....dis 40 @ 45 %

₩ doz.	$3 50	4 00	4 50	5 00	5 50	6 50	7 50	9 00	10 00
No.....	0	1	2	3	4	5	6	7	8

Burnished.....dis 40 @ 45 %

₩ doz.	$3 00	3 75	4 25	4 75	5 25	6 00	7 00	8 00	9 00
No.....	0	1	2	3	4	5	6	7	8

Files.
Nicholson Mill Files.....new list
" Bastard..... "
" Taper..... "
Butcher's Mill (Advanced March 8th)...$4 75 to £ gold
" Bastard..... 4 75 to £ gold
" Taper..... 4 75 to £ gold
Fluting Machines.
K. F. M.—4¼ in. rolls, $5 50.....dis 15 %
" —6 in. rolls, $6 50.....dis 15 %
Mrs Knox—4 in. rolls, $5 75.....dis 20 %
" —6 in. rolls, 7 00.....dis 20 %
Hammers.
Yerkes & Plumb's.....dis 15 %
Hammond & Son's.....dis 15 %
Verree.....dis 20 %
Hatchets.
Beatty's.....dis 15 @ 20 %

Shingling and Half. { ₩ doz.	$7 00	7 50	7 75	8 00
{ No.	1	2	3	

Yerkes & Plumb.....dis 15 %

Shingling and Half. { ₩ doz.	$7 00	7 50	8 00	8 50
{ No.	1	2	3	4
Claw.... { ₩ doz.	$7 00	8 00		
{ No.	1	2		3

Hinges.
Strap and T, (Changed March 24).....dis 45 %
Horse Nails.

	Nos.	6	7	8	9	10
Ausable		27	25	24	23	22
Globe		28	26	25	24	23
Brundage		36	34	28	22	21
	Nos.	5	6	7	8	9 10
Putnam		32	28	26	25	24 22

On Ausable, Globe and Brundage 1000 ℔ lots.....dis 5 %
Knobs.—Door, Mortise and Rim.
Makes in Combination.....new list dis 45&5 %
Extra discount for cash 2 %
Mineral and Rim.....dis 5 %
Locks and Latches.—Rim and Mortise.... dis 40&5 %
Extra discount for cash 2 %
Till and Cupboard.....dis 25 %
American Padlocks.....dis 0 %
Extra discount for cash 2 %
Scandinavian Pad Locks.

₩ doz.	$10 50	10 50	12 00	13 00	15 00	15 00	dis 25
No.....	59	59½	60	60½	61	61½	
₩ doz.	$18 00		18 00	22 00		22 00	dis 25
No.....	62		62½	63		63½	

Trunk Locks.....dis 5 @ 10 %
Thumb and Roggens Latches.....dis 25 %
Lanterns.—Square Candle and Oil.....dis 10 %
Globe for Oil.....dis 10 %
" Kerosene.....dis 10 %
Tubular Lanterns.....dis 10 %
Mattocks.—Long and Short Cutter.....dis 25 %
Western Pattern.....dis 25 %
Pennsylvania Pattern.....dis 15 %
Molasses Gates.
Enterprise Mfg. Co.'s Measuring Faucets.....dis 20 %
Stebbins' Gates.....dis 62½ @ 62½&10 %
Lincoln's.....dis 40&10 @ 50 %
Landers, Frary & Clark's Petroleum.....dis 15&10 %
Taylor's Petroleum Faucets.....dis 20&10 %
Brass Liquor Cocks.....dis 20&10 %
Meat Cutters.—Dixon's.....dis 20 %
Woodruff.....dis 20 %
Stowe.....dis 20 %
Hale's.....dis 35 %
Stuffers.....dis 20 %
Planes.—Auburn Tool Co., "Bench".....dis 40 %
Second Quality.....dis 50 %
Metallic Plane Co.....dis 25&5 %
Evans Pat. Circular.....net
Plumbs and Levels.
Adjustable.....dis 60&10 %
Non-Adjustable.....dis 60, 10&10 %
Plane Irons.—American.....list net
Butcher's.....gold £, $5 50
Picks.—Philadelphia.....net
Pittsburgh.....net
Rules.....dis 60&10 %
Rakes.—Cast Steel Garden.....dis 40 @ 40&5 %
Malleable Garden.....dis 40 @ 40&5 %
Wood Head Iron Teeth.....dis 40 %
Steelyards.—American Pattern.....dis 15 %

₩ doz.	$3 50	7 00	9 00	10 00	11 00	12 00
No.....	50	100	150	200	250	300

English Pattern.....dis 15 %

₩ doz.	$7 00	8 67	10 67	12 67	14 67	16 67
No.....	50	100	150	200	250	300

Hart's Pattern.....dis 50 %

₩ doz.	$14 50	17 75	21 00	26 00	31 50	35 50
No.....	50	100	150	200	250	300

Scythes.—Golden Clipper, Damascus Blade, Boxed and Sharpened.....₩ doz. $10 00 net
Golden Clipper No. 10, Boxed and Sharpened.....₩ doz $9 75 net
Green Clipper No. 5, Boxed and Sharpened.....₩ doz $9 50 net
Common Scythes.....₩ doz $7 50 @ 9 00
Squares.—Steel and Iron, new list.....dis 50 %
Saws.—Disston's cross Cut.....dis 15 %
Disston's Hand.....dis 12½ %
W. McNiece's H'd, Cross-Cut & Circ'r, new list..dis 15 %
Boynton's Lightning, new list.....dis 40 %
" Champion.....dis 45 %
Shovels and Spades.
Rowland's Plain Back, Jan. 25d.....dis 35 %
" Back Strap " .....dis 35 %
Oliver Ames & Sons.....dis 20 %
Brady Shovel Co.....dis 20&5 %
Sad Irons.—Richmond (polished face).....per lb. 8½c
Richmond (polished face)..... by the case 8¼c
Stone.—Arkansas Oil, No. 1.....₩ ℔ $
Turkey Oil, No. 1.....net " 35c
Wasnita Extra.....net " 10c
" No. 1.....net " 45c
" " 2.....net " 5½c

Screws.
United States and others in Combination.....dis 40 %
Keystone, not in Combination.....dis 40&5 %
Spoons.—
Plated.....dis 40&10 @ 50 %
Britannia, Boardmans (new list).....dis 50&10 %
" Parkers (old list).....dis 50 @ 50&10 %
German Silver.....dis 30 %
" Light.....new list dis 35 %
Lalance & Grosjean Iron.....dis 10 %
Springs.—Gray's Door.....dis 60&10 %
Torry's Door.....dis 60&10%
Stocks and Dies......dis 10&5 %
Stove Polish.—Gem.....₩ gross, $5 00
Onyx.....₩ " $3 00
Try Squares.—Winterbottom.....dis 10 @ 15 %
Stanley Rule and Level Co.....dis 45&10 %
Willis Thrall, No. 2.....dis 30&10 %
Disston's No. 7.....dis 40 %
Tacks, &c.—Half Weight Tacks.....dis 72½ %
" " by the case...dis 72½&7½ %
Clout and Finishing Nails.....7½ %
" " by the case.....dis 7½ %
Traps.—Genuine Oneida—Newhouse list.....dis 20 %
" Imitation " " .....dis 30 %
Vises.—Solid Box, currency.....₩ ℔ net 14c
Wrenches.—Coes Genuine.....dis ₩ @ 40&5 %
Coes Imitation Wrought Bar.....dis 50&10 %
" " Malleable Bar.....dis 60&10 %
" " (Kellogg) Malleable Bar.....dis 65&10 %
Tafts Pattern (Wrought Bar).....dis 70 @ 70&10 %
Philadelphia Tool Co.'s Pat. Duplex.....dis 25 %
" " " Improved Baxter.....dis 25 %
" " " Adjustable Fork.....dis 25 %
Wire.—No. 0 to 18.....(Advanced April 24th)..dis 47½ %
No. 19 to 26..... " " .....dis 50 %
No. 27 to 30..... " " .....dis 52½ %
Coppered 0 to 12.....dis 15 @ 20 %
Tinned Broom Wire.....dis 35 %
Galvanized Wire No. 1 to 18.....dis 40 %

BUFFALO.

Reported by Messrs. Sidney Shepard & Co.
November 6, 1875.

Augers—Snell Mfg. Co.....dis 25 %
Axes—Francis.....11 50
Bits, Auger—Snell Mfg. Co.....dis 25 %
Phœnix.....dis 40 %
Bells, Cow—Yaw's Genuine.....dis 25 %
Braces—Bit, Spofford's Patent.....dis 50 %
Brads, Cut.....dis 50 %
Boards—Stove, Brooks' Pat. dis 35 % 4 mos.; 35&5 % 30 dys
Belting—Rubber.....dis 30 @ 10 %
Leather, new list, oak tanned.....dis 20 %
Brick—Bath (box of 2 doz) Best English.....$1 25
" Rutherford.....$1 00
Can Openers—Sprague's.....dis 50 %
Cases—Parlor Coal Hod.....dis 15 %
Chalk—White, Carpenter's.....₩ gross. 57c
Red, Carpenter's....." 90c
Chisels—Firmer Socket.....dis 60, 10&10 %
Framing Socket.....dis 60, 10&10 %
Corner Socket Chisels.....dis 60, 10&10 %
Slick's Carpenters'.....dis 60, 10&10 %
Castings—Malleable.....₩ ℔ 9½c
Cutters—Meat, "Hales".....35 %
Egg Beaters—"Peerless".....per doz $3 60
" Centripetal".....per doz 5 00
Elbows—Corrugated.....dis 10 %
Adjustable.....dis 10 %
Files—Maischoss Bros.....dis 20 %
Fluters—Geneva Hand.....dis 50 %
Freezers Ice Cream—" Champion".....₩ doz., $15 00
Hammers—Henry W. Kip's.....dis 35 %
Hinges, Gate—Shepard's.....dis 10 %
Hinges—Window Blind—
Shepard's and Standard.....dis 30&10 %
Hods, Coal—Plain, Black and Galvan'd...dis 60, 10&5 %
Funnel, Black and Galvanized.....new list dis 15 %
Fancy and Helmet.....dis 15 %
Sad Irons.....dis 15 %
Kettles—Brass.....35½c
Copper, "Hand Made".....₩ ℔, 43c
Enameled.....38c. @ 40c.
Knives, Drawing—Oval No. 1.....dis 50&10 %
Razor Blade.....dis 60&10 %
Lanterns "Peerless."....No. 1 3 10
₩ doz $36 00 $10 50 $13 75 dis 10 %
" with Guards.....$11 00
Tinguar.....dis 40 %
Machines—Apple Paring, "Keystone".....7 75 ₩ doz
Machines—Boring, Snell's.....dis 20 %
Mills, Coffee—Box and Side, common.....dis 15 %
Box Union and Eagle.....dis 15 %
" American.....dis 20 %
Molasses Gates—"Self Measuring".....dis 20 %
Nails—Clout and Finishing.....dis 7½ %
Shoe.....dis 7½ %
Cut, "Chesapeake," 10d.....$3 10
Horse, Ausable.....No. 3 7 8 9 10
30 27 25 24 23 22c
" " Pointed & Polished.....add 1c ₩ ℔
" " 1000 lbs.....dis 5 %
" Clinton.....No. 6 7 8 9 10
21 19 18 17 16c
Packing—Rubber.....dis 30 @ 10 %
Paint—White Lead, U. S. Gov't.....₩ ℔ 8½c
Pans—Dripping.....₩ ℔ 10c
Rivets—Iron, Black and Tinned.....dis 25&7½ %
Screws—"American Screw Co"—
Flat Head, Iron.....dis 30 %
Flat Head, Brass.....dis 30 %
Sleeves—Wood, Hoop Iron.....$1 30
Tinned.....1 75
Skates and Straps—White's.....dis 30 %
Spoons, Iron Tinned.....dis 10 %
" by the case.....dis 20 %
Plated Rogers' A No. 1.....dis 50 %
Britannia.....dis 50&10 %
G. S. Hall, Elton & Co.....dis 30&5 %
Squares—Steel and Iron.....new list 50 %
Scales—Buffalo Scale Works.....dis 25 %
Fairbanks.....dis 15 %
Stove Polish—Gem.....₩ gross, $4 50
" Dixon's.....6 00
Tacks—Half Weight Am. Iron.....dis 72½&7½ %
Tea Trays.....dis. 15 %
Tools—Machinists' and Tinmens'.....dis 10 %
Vases—Palace Coal.....dis 15 %
Vises—
Parallel, Buffalo...Old pattern, dis. 30 %; new, do.dis 20 %
Ware—French, Tinned and Iron.....dis 20&10 %
Stamped and Japanned.....dis 10 %
Cast Iron Hollow.....dis 40 %
Wire—Bessemer Steel.....dis 10 %
Tin Plates.—Add for each X.....7 50
10x14, IC. Charcoal... $9 50 | 14x20 C. terne.....$8 75
12x12. " 10 00 | 30x28 C. " 19 50
12½x17, " 9 00 | 30x28 X. " 24 00
14x20, " 10 50 |
Pig Tin—Straits.....25c @ 26c
Bar Tin.....24c
Solder—No. 1, Crook's.....16 c
Sheet Zinc—
" Lasalle".....570 100 ℔ casks
$10 50 10 80 ₩ 100 ℔s
Sheets.....$10 50
Babbitt Metal.....₩ ℔ 12c
Iron Wire—Bright and Annealed.....dis 45 %
Coppered.....dis 40 %
Tinned.....dis 25 %
Tinned Broom, { Nos. 20 21 22 } .....dis 35 %
{ 20c 21c 21c }
Copper—Sheathing 14 @ 18 oz.....₩ ℔ 30c
Planished.....₩ ℔ 37c @ 39c
Bottoms.....₩ ℔ 32c
Bolts.....₩ ℔ 31 @ 33c
Braziers' Sheets.....₩ ℔ 31 @ 33c
Sheet Iron.—
18 Common.....$4 05
24 Common.....4 25
26 Common.....4 45
24 W. D. Wood & Co., Smooth Finish.....5 15

Planished.....	A. 14c	B. 11c

Gen. Russia, No. 1 stained.....16c
" " clean.....15c
Galvanized.....dis 33½ %

CINCINNATI.

Reported by Sellew & Co., Importers and Jobbers Metals, No. 214, 216 and 218 Main street.
November 1, 1875.

Tin Plate.—I. C. 10x14 Charcoal.....$9 50 @ 10 00
I. X. 10x14 Charcoal.....12 00 @ 12 50
I. C. Terne 14x20.....8 75 @ 9 50
I. C. Terne 20x28.....20 50 @ 21 00
I. C. 20 inches Continuous.....21 00
Block Tin.—
Pig.....₩ ℔ 25c
Bars.....₩ ℔ 26c
Solder.—
A I.....₩ ℔ 16c
Roofing.....₩ ℔ 17c
S. & Co.....₩ ℔ 19c
Lead.—Pig.....₩ ℔ 7½c.
Bar.....₩ ℔ 8½c
Copper.—
Ingot.....₩ ℔ @ 24c
Planished.....@ 38c
Sheathing.....@ 31c
Cooper Drops.....@ 34c
Sheets.. 6 to 7 lb.....@ 37c
" 8 to 9 lb.....@ 35c
" 10 to 12 oz.....@ 33c
" 13 lb. up.....@ 31c
Copper Bottoms.....@ 38c
Zinc. Cask, 500 to 1000 lbs.....₩ ℔ 10½ @ 10¾c
Case, 100 lbs.....10¾ @ 11 c
Slab.....7½c
Brass.—Roll, No. 6 to 30.....₩ ℔ 36c
Roll, No. 30 to 36.....35c
Wire, No. 0 to 30.....35c
" 20 to 25.....40c
Babbit Metal.—Sellew & Co.....35c
Aliens'.....20c
Market.....12c
Antimony.....₩ ℔ 12c
Bismuth.....₩ ℔ $4 00
Nickel.....₩ ℔ $3 50
Russia Iron.—Bundle.....₩ ℔ 16c
Less than bundle.....₩ ℔ 18c
No. Stained.....₩ ℔ 15c @ 16c

Sheet Iron.	Com. B.	Smooth Fin. S. L. U.	Smooth D Re'fd.
15 to 20	4c	5 10c	7 10
22 to 24	3 30c	5 30c	6 90
26	4c	5 50c	7 05
27	4 20c	5 ¾c	7¼
30	5¼c		

Galvanized Iron.—Full bundles.....dis 30 %

Nos. 1s to 20	12c	No. 26	14c
22 to 24	13c	27	15c

Bar Steel.—Silver, ₩ ℔ 16c Crescent, 21c.
Iron Wire.....dis 35 %
Enameled Ware.....dis 50 %

One Piece Corrugated Elbows.....dis 10 %

Charcoal Iron.		Russia Iron.	
4½ inch.....	₩ doz $2 50	4½ inch.....	₩ doz $3 00
5 "	" 3 50	5 "	" 7 00
5½ "	" 4 50	5½ "	" 7 50
6 "	" 5 50	6 "	" 12 00
7 "	" 6 50	7 "	" 14 00

Leader Elbows, Flat Crimp Retinned or Galvanized.—Dis. 10 %

	₩ doz.		₩ doz
2-inch.....	$1 75	2½-inch.....	$2 75
3-inch.....	2 25	3½-inch.....	3 25
4-inch.....	2 50	4½-inch.....	3 50

Sheet Iron Bread Pans.....₩ ℔ 8½c
American Broilers.....₩ doz. $13 50
Tinmen's Machines.....dis 5 %
Sad Irons.—I X L's.....₩ ℔, 3½c
Brass Kettles.—Ansonia.....43c
Dog Irons.....3 c

PITTSBURGH.

The following are the Card rates of Lewis, Oliver & Phillips, H. B. Newhall, 11 Warren st., New York, Agent.
Iron, standard list assorted sizes, for large orders, specifications to include Bands, small Rounds and Ovals, 25c. rate, 2 % off net.
Flat Rail (1¼x¼), punched and coun'sunk..4½c ₩ ℔ net
Iron Wedges.....4½c ₩ ℔ net
Norway Nail Rods.....8½c ₩ ℔ net
Crow Bars (in ordering please state whether "Wedge" or "Pinch" point).....4¾c ₩ ℔ net
Beetle Rings.....8 c ₩ ℔ net
Fence Pickets—
⅝ round, bent to shape, 25c ₩ ft. of fence, less 15 % off net.
Discount off Standard List.
Carriage and Tire Bolts.....75 % off net
Carriage and Tire Bolts delivered on cars or boats in Pittsburgh.
Stove Bolts.....20 % off net
Machine and Square Head Bolts.....40&10 % off net
Coach and Lag Screws.....40&10 % off net
Bolt Ends.....40 % off net
Pat. Hot Pressed Square and Hexagon Nuts, small sizes, from 3-16 to ⅜ in.....8½c ₩ ℔ off net
Pat. Hot Pressed Square and Hexagon Nuts, large sizes, from 7-16 to 2 in.....6¾c ₩ ℔ off net
Washers, all made from new band iron, small sizes, from 3-16 to ⅜ in.....9¾c ₩ ℔ off net
Washers, all made from new band iron, large sizes, from 7-16 to 1¾ in.....7¾c ₩ ℔ off net
Nuts and Washers in 25 lb. boxes, ¼c ₩ ℔ ex. Nuts and Washers in lots less than one keg each size, ½c ₩ ℔ ex. Nuts and Washers in 5 lb. boxes, 1c. ₩ ℔ ex. net prices.
Standard Caps, for Plows.....5¾c. ₩ ℔ net
Iron Harrow Teeth, in lots of 1 ton or more, packed in 200 lb. boxes, 1 in. diam. 3¼c ₩ ℔ net; ⅞ in. diam. 3½c ₩ ℔ net; ¾ in. diam. 3¾c ₩ ℔ net.
Patent Headed Harrow Teeth, packed in boxes ½c ₩ ℔ ex
Skein Bolts, in bulk, in lots of 1 keg or more, ⅝ in. diam. 5c ₩ ℔ net; 9-16 in. diam. 6c ₩ ℔ net; ½ in. diam. 7c ₩ ℔ net. 1c ₩ ℔ extra when less than 1 keg of each size is ordered.
Strap & T Hinges...33½&10 % off net, delivery as custo'ry
Screw Hitching Rings.....$5 25 ₩ 100 net
Bridge and Roof Bolts—
1 to 2 in. diam. over 8 ft. long.....₩ ℔ 3¾c net
1 to 2 in. diam. from 4 to 8 ft. long..... " 4 c net
1 to 2 in. diam. from 1½ to 4 ft. long..... " 4¼c net
⅝, ¾ and ⅞ in. diam. over 4 ft. long..... " 4¾c net
⅝, ¾ and ⅞ in. diam. from 1½ to 4 ft. long " 5 c net
Bridge bolts with upset ends.....¼c. ₩ ℔ extra
Wrought iron plates, punched.....4¼c. ₩ ℔ net
Cast Iron Washers.....₩ ℔ 3¾c net
Duck Nest Tuyere Irons.....$14 50 ₩ doz net

WAGON HARDWARE.

Wagon Box Strap Bolts—

10 in. long by 7-16 at Screw End, ₩ set of 8 bolts..							45c
12	"	½	"	"	8	"	55c
10	"	9-16	"	"	8	"	65c
12	"	9-16	"	"	8	"	70c
14	"	9-16	"	"	8	"	80c
10	"	⅝	"	"	8	"	80c
12	"	⅝	"	"	8	"	90c
14	"	⅝	"	"	8	"	90c
16	"	⅝	"	"	8	"	1 00
18	"	⅝	"	"	8	"	1 10
20	"	⅝	"	"	8	"	1 20

5c ₩ set for each additional inch over 14 in All lengths made.
In ordering Box Strap Bolts please give diameter at Screw End.
Wagon Box Rods, narrow track, each.....15c
" " wide track, each.....17c
Single Tree Irons, ₩ set of four pieces.....80c
Wrought Iron Bolster Plates, 2¾ in. wide, ₩ set.....45c
" " " 3 " " " 50c
" " " 3½ " " 55c
" " " 3¾ " " 60c
Wagon Brake Ratchets, each.....14 c
" " " finished with guard, each..40 c
Wrought Hammer Straps, heavy pattern, each.....13 c
" " " light " each.....12 c
" Rub Irons, each.....9 c
Stay Chain Hooks, each.....5½c
Double and Single Tree Clips, figure 1, each.....8 c
" " " " 2, each.....9 c
" " " " 3, each.....11 c
Axle Clips, Round Part ⅝, Flat Part 1¼, each.....8c
Wagon Clevis, including Pin, complete, each.....10c
Pole Caps, each.....24c
Single Tree Hooks, Nos. 1 and 2.....4½c
Strap Bolts, Rods, Single Tree Irons, Bolster Plates, Brake Ratchets, Hammer Straps, Rub Irons, Stay Chain Hooks, Clevis and Pin, Clips, Single Tree Hooks, and Pole Caps, in lots of 50 sets.....dis 15 %
Wagon Box Staples, 1¼ to 2¼ in. to clinch. ₩ 1000 $1 00 net
" " " Bevel Box Iron, to rivet on. ₩ 1000 7 50 net
Neck Yoke Eyes, each.....4½c net
" " " with ⅝ rings, each.....7¼c net
King Bolts, ⅝, 1, 1¼, and 1¼ in. diam.....₩ ℔ 4½c net
Wagon Rivets, ex. large, flat, oval and steeple head, ¼ in. diam. all lengths.....8½c net
Wagon Rivets, 3-16 in. diam., all lengths.....9½c net
" ⅜ to 1 inch long.....₩ ℔ 1c extra
" & Nails, in 5 ℔ paper boxes..... " 1c extra
" " in 25 ℔ wood " ¼c extra
Wagon and Hinge Nails, ¼ in.....₩ ℔ 17 c net
" " " 3-16 in.....19 c net
Wagon Rivets and Nails, in less lots than one keg each size.....¼c extra
Double Tree Plates.....5c net
Coupling " .....5c net
Tongue " .....8¾c net
Neck Yoke Plates.....10½c net
Tongue Cap Iron, 1¾, 2 & 2¾ in. wide, same price ₩ ℔ as Band Iron.
Wagon Chains, Stay, Lock and Tongue, 5-16 in. ₩ ℔ 10¼c net. ¼ in., 11¼c. net
Above prices are free on board cars in Pittsburgh. Subject to change of market, without notice.

DETROIT.

(Reported by Messrs. Jewett & Root.)
Nov. 8, 1875.

Tin Plate.—Best Charcoal

IC, 10x14	$ 9 75
IX, 10x14	12 25
XX, 10x14	14 75
IC, 12x12	10 25
IX, 12x12	12 75
IC, 14x20	10 75
IX, 14x20	13 25
XX, 14x20	15 75
XXX, 14x20	18 25
XXXX, 14x20	20 75
DC, 100 Plate	9 25
DX "	11 75
DXX "	14 25
DXXX "	16 75
DXXXX 100 Plate	19 25
IX, 14x14	19 25
IC, 10x14 W	9 25
IX, 10x14 W	11 75

Roofing Tin.—Best Char.

IC, Terne, 14x20	$ 9 00
IX " 14x20	11 00
IC, Terne, 20x28	19 00
IX " 20x28	24 00

Coke Tin.—

IC, 10x14 Coke	$ 9 00
IX, 10x14, Coke	11 50
IC, 14x20 "	10 00

Solder.—No. 1.....18c
No. 2.....15c

Pig Tin.—
Large Pigs.....24c
Small Pigs.....25c
Bars.....26c
Bright Wire.
65 lbs. in bdl.....dis —
Copper.—
Sheathing.....31c
Copper Bottoms.....32c
Planished Copper.—
Sheathing, 14x48.....38c
Boiler Size, No. 7.....40c
" " No. 8.....40c
" " No. 9.....40c
Sheet Iron.—
No. 18 Am. Com.....4 00
No. 24 Am. Com.....4 20
No. 26 Am. Com.....4 40
No. 27, Am. Com.....4 60
W. D. WOOD'S & CO.'S SHEET IRON.—
Nos. 15 to 20 Smooth $5 00
" 21 to 24..... 5 20
" 25 & 26..... 5 40
" 21 to 24 Charl'..... 6 70
" 25 & 26 " 6 90
RUSSIA.
Genuine.....17c
Imitation.....14c

Watchman's Improved Time Detectors.

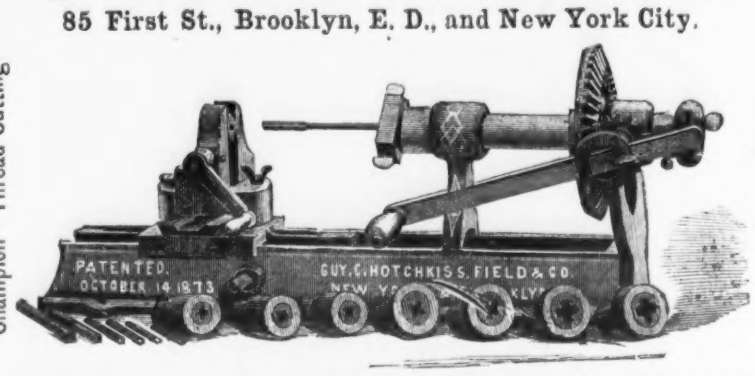
U. S. Patent, April 24, 1873.

This is the latest and most complete instrument invented, with 12 keys for 12 stations. Send for circular to IMHAUSER & CO., 212 Broadway, N. Y. P. O. Box 4708.

Send 50 cents for 6 samples (Prepaid) of
HAMMOND'S WINDOW SPRINGS,
For supporting and locking upper and lower sashes of all windows. Not a coiled spring, but one *forged* from best materials.
W. S. HAMMOND, Lewisberry, York Co., Pa.

TACKLE BLOCKS
BURR & CO.,
Manufacturers of Waterman and Russel's
Patent Iron Strapped Blocks,
ALSO, MANUFACTURERS OF
ROPE STRAPPED BLOCKS.
81 PECK SLIP, NEW YORK.

Guy C. Hotchkiss, Field & Co.,
85 First St., Brooklyn, E. D., and New York City.



"Champion" Thread Cutting and Nut Tapping Machine.

This machine has revolving and sliding jams, which enables the operator to cut all kinds work, no matter how irregular in shape it may be. It cuts a perfect thread at once going over. As much work can be done in one hour by this machine as in a day with stocks and dies. Send for Circular.

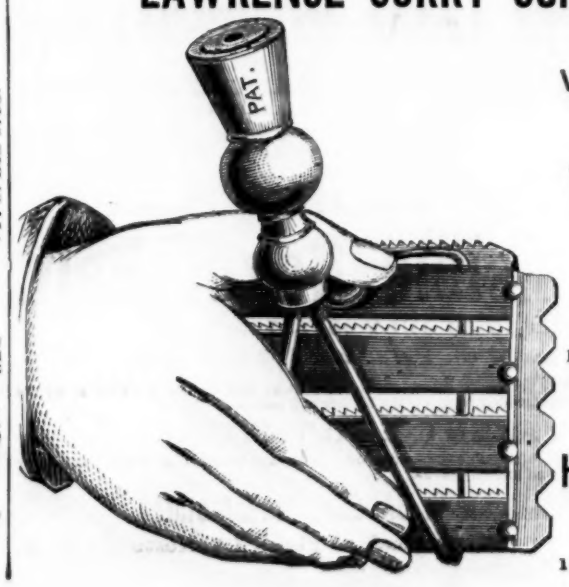
Manufacture Carriage Materials, Axles, Springs, Blacksmiths' Supplies, Bolts, Wood Work, Trimmings, &c.
IMPORTERS AND DEALERS IN
IRON AND STEEL.

FOR MELTING ALL KINDS OF METALS,
And Manufacturers of
Sunny Side Stove Polish.
Lumber Pencils, Foundry Facings and Lubricating Plumbago.
STROW, WILE & CO.,
Nos. 1324, 1326, 1328, 1330, 1332 & 1334 Callowhill St., Phila
GENERAL AGENTS:
Messrs. HALL & CARPENTER, 709 Market St., Phila.

Ausable Horse Nail Co.,
MANUFACTURERS OF
HAMMERED,
Hammer Pointed, Polished & Blued
HORSE NAILS,
FROM
BENZON IRON.
Orders promptly filled at lowest market rates.
ABRAHAM BUSSING, Secretary,
35 Chambers Street, New York.

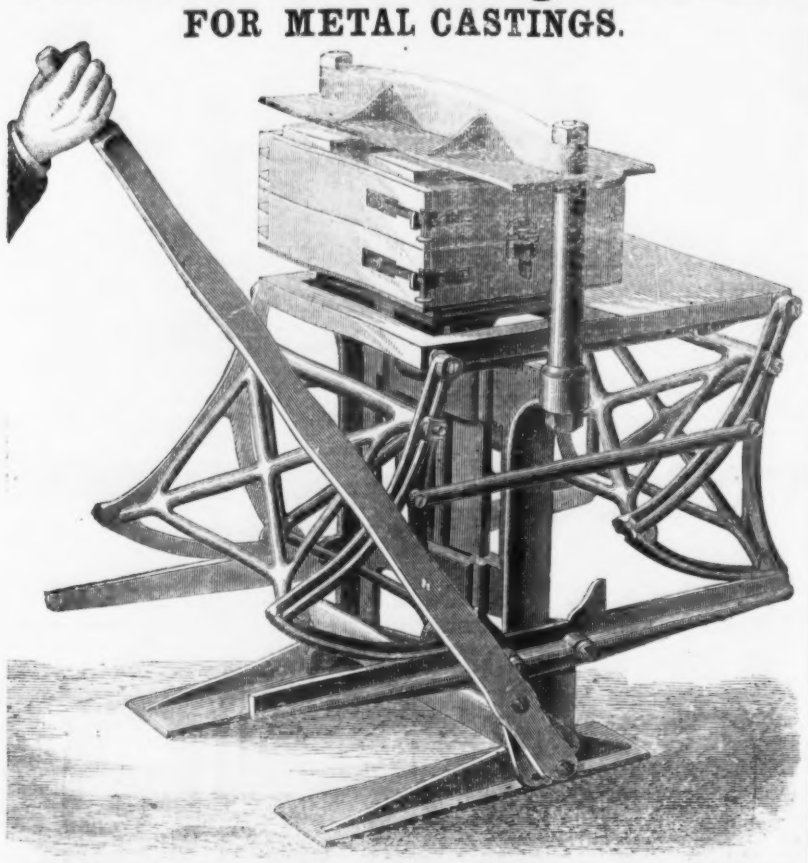
GLOBE NAIL COMPANY,
MANUFACTURERS OF
Pointed, Polished & Finished Horse Shoe Nails.
Recommended by over 20,000 Horse Shoers.
All nails made from best NORWAY IRON, and warranted perfect and ready for driving. Orders filled promptly and at lowest rates by
GLOBE NAIL CO., Boston, Mass.

THE PERFECT COMB,
MADE BY THE
LAWRENCE CURRY COMB CO.



WITH
WIRE BRACES.
All Wrought Iron.
The BEST, STRONGEST and Most DURABLE COMB Ever Made.
Patented: May 5, 1874
Nov. 17, 1874.
Aug. 24, 1875
FOR SALE BY
Hermann Boker & Co.,
101 & 103 Duane St., N. Y.

Eames' Pat. Molding Machine
FOR METAL CASTINGS.



The above machines have recently been introduced in several large iron foundries in this country, where they have given entire satisfaction. Among the advantages are:

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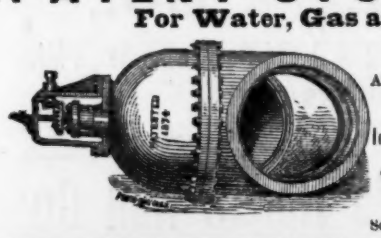

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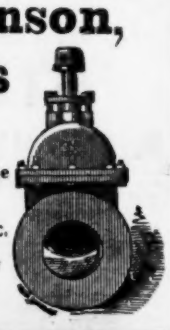

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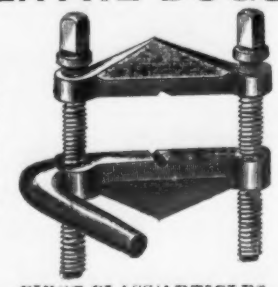

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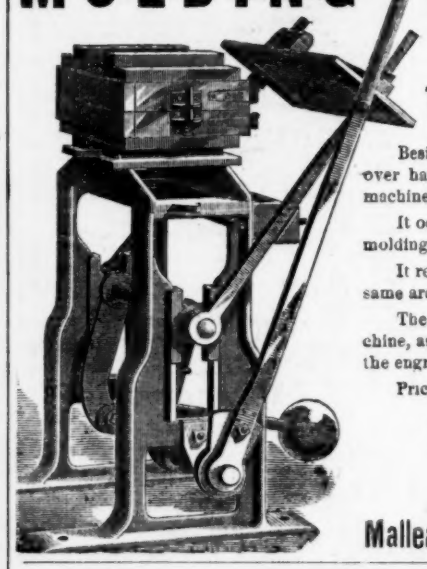

Beside all advantages Molding Machines possess over hand molding, it is especially claimed for this machine, that:

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It requires no special flasks or boards, but the same are used as for hand molding.

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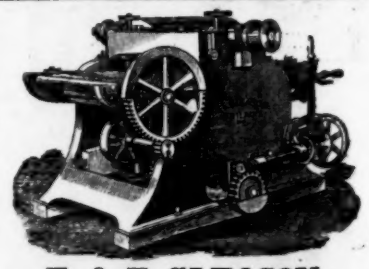

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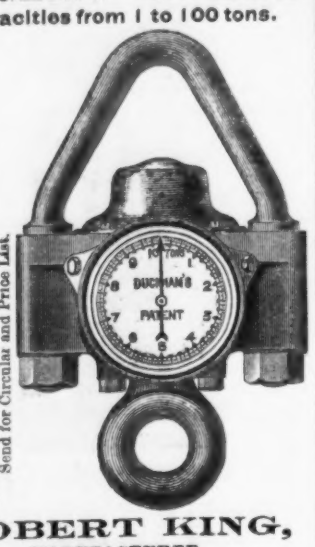

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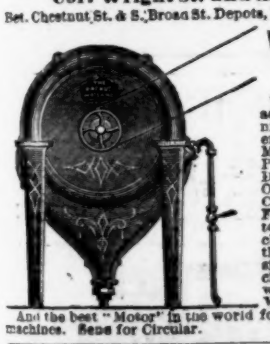

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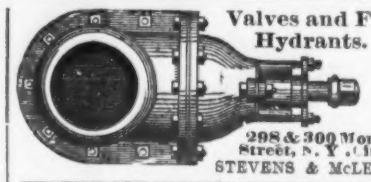

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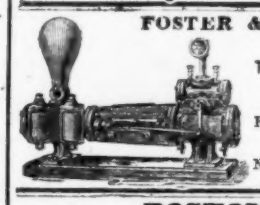

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Dry Sheathing....." 3 c
" "Beaver Brand" Rosin Sized.." 3½c
Tar'd " " " " 3 c
Felt " " " " 1½c
Virginia Cane Fibre.....4½c
Picks.—L. P. & Co., Solid Eyes.....5 to 6 6 to 7
$8 00 $9 50
Pins.—Universal Hat and Coat all wood—
2 in.....₩ gross $2 50; 3 in., 3 50; 4 in., 4 50—dis 15 %
Potato Digger,—
"Partridge," 6 square tine.....₩ doz $12 00
Shumway & Co., 6 round tine.....₩ doz 9 00
Pulleys,—Axle.
Frame Pol. Wheel....No. 150, 50c., 1¼ in.; 16, 38c., 2 in.
Common Axle.....No. 18, 34c., 1¼ in.; 20, 40c., 2 in.
Milled Axle.....No. 2, 42c., 1½ in.; 2, 50c., 2 in.
Nashua Pat. Axle Bronzed Face...1¼ in., 80c.; 2 in., 90c
Cast Steel Axle.....2 in., $1 00
Pulley Blocks,—"Best Boston Make".....net
Common Strapped Blocks—

	5	6	7	inch.
Single, 75c.	85c.	$1 00	$1 13	each.
Double, $1 00	1 12	1 25	1 60	"

Inside Iron Strapped Blocks—

	5	6	7	10	inch.
Single, $1 00	1 13	1 38	2 00	2 25	2 75 each.
Double, 1 88	2 00	2 63	3 63	4 00	5 00 "

Inside Iron Strapped Blocks, with Patent Roller Bushings—

	5	6	8	10	inch.
Single, $1 25	1 50	1 63	2 50	2 75	3 50 each.
Double, 2 50	3 00	3 38	4 63	5 00	6 50 "

Plated Ware.—Rogers Bros.....dis 50 %
Plumb & Levels.—"Davis" Pat. Adjustable—
No. 1, Iron and Wood Center Levels.....dis 50 %
No. 2, First Quality Levels.....dis 60 & 10 %
No. 3, Iron Pocket " .....dis 35 %
No. 4, Level and Plumb Glasses.....dis 60 & 10 %
No. 5, Iron Pocket Levels, per square and straight edge.....dis 50 & 10 %
No. 6, Improved Iron Bench Planes.....dis 20 & 10 %
Pocket Knives.—Conn. Cutlery Co.....new net list
American Shear Co.....new net list
Rail Barn Door.—For Novelty and Anti-Friction Hangers.....per foot 7c., dis 30 %
Rivets.—Black.....dis 50 %
Carriage, oval head. Nos. 3, 4, 5, 6, 7, 8.....dis 35 %
Rubber Moldings.—"Harmon's".....dis 10 %
No. 2, for Windows.....per foot, 5c
No. 3, for Doors.....per foot, 11c
No. 4, " .....per foot, 12c
Miller's Patent.....per foot, 4½c
Sad Irons.—Bliss & Drake.....₩ lb 8c
Sand Paper—0 to 2, $4 25; 2 to 3, $4 75.....dis 10 %
Saws.—*Hand and Panel*—
Wheeler, Madden & Clemson's, same list as "Disston's".....dis. 15 & 5 %
Disston's.....dis. 12½ %
Cross Cut—
Wheeler, Madden & Clemson X Cuts.....per ft., 37c
" " " "Star" X Cuts. " 30c
" " " Champion X Cut. " 50c
" " " One Man X Cut..each, $2 25
Boynton's genuine Lightning X Cut.....per ft., 50c
" " " One Man X Cut..each, $2 00
Circular—Wheeler, Madden & Clemson's.....dis. 25 %
Mill— " " " " .....dis. 25 %
Screws.—Am. Screw Co., new list Sept. 1st.....dis 40 %
Aiken's.....dis 40 %
Scythe Stones.—
"Willoughby Lake," first quality.....₩ gross $6 50
" " second quality....." 3 00
Shovels.—O. Ames.....dis 20 %
M. B. & D.....dis 20 %
Snow, Malleable Iron Tip, D Handle—Agents for New England.....$6 50
Snow, Malleable Iron Tip, long Handle—Agents for New England.....5 50
Sifters.—Coal, Rice, &c.....$12 00
Spading Forks.—M. & E.....dis 25 %
Stone Pickers.—"Partridge," original...₩ doz $15 00
Tools.—Aiken's Pattern, 40 in set; Parr's, 37 5; per doz
Traps.—Oneida.....dis 25 %
Blake's.....dis 30 %
Vises.—L. P. & Co.'s Solid Box. Blacksmith.....₩ lb 13c
Parker's Parallel.....dis 10 %
Backus.....dis 25 %
"Howards." Parallel.....dis 20 %
Wardrobe Hooks.—Wire to drive.....₩ gross $1 00
Weather Strips.—"Harmon's".....per doz $8, dis 10 %
Weights.—Window Weights.....₩ lb 2c
Wedges—Axe.....₩ doz 38c
Wire.—
Eureka, in spools, No. 28 to 40 assorted...₩ gross $3 50
Wire Netting.—Clinton Wire Cloth Co., Green, Drab or Black.....₩ ft 5½c
Wrenches.—Genuine Wrenches, G. A. Coes..dis 40 & 5 %
Walton.....dis 50 %
Wringers.—
Novelty { Tub No. 2 { .....Less than doz, $12 00
.....½ doz or more, 10 00
Universal { Bench A.....less than 2 doz $36 00; 2 doz or more $34 00
" B.....$4 00 " " 9 00
" C.....110 00 " " 107 00
Eureka.....60 00 " " 58 00
Withington, Cooley & Co.—
Hoes, Rakes, Forks, &c.....dis 33⅓ & 5 %

Boston Metal Market.

(Corrected by Fuller, Dana & Fitz, 110 North Street, Boston, Importers and Commission Merchants.)

September 1, 1875.

Iron.—Best Refined Bar Iron.....₩ ton $57 50
"Burden Best" " " " 56 00
Swedish Bar Iron.....gold " 110 00
Norway Shapes.....gold " 122 50
Norway Nail Rods.....gold " 130 00
Sheet Iron, American.....₩ lb 4½c
" " Galvanized.....₩ c
" " Russian.....gold " 18½c
Plate Iron, C. No. 1.....3½c
Iron Rails.....₩ ton $60 00
Steel Rails.....gold " 75 00
Pig Iron, Foundry, No. 1 extra.....gold " 27 00
" " No. 2 extra.....gold " 25 00
" Gray Forge.....gold " 24 00
" Scotch.....gold " 30 00 @ 32 00
Wrought Scrap Iron.....gold " 31 00
Old Rails.....gold " 28 00
Steel.—₩ lb | German.....₩ lb 9½c
Eng. Tool, gold 15½c | Spring.....8 c
American Tool 14½c | Tire.....6 c
" Marsh 9½c | Sleigh Shoe.....4½c
Bessemer.....7 c | Toe Calk.....7½c
Tin Plates.—₩ box, gold | **Copper.**—₩ lb
I. C. Char. 10x14.....$7 75 | Ingot.....23½c
I. C. Coke 10x14.....7 00 | Bolt.....30c
Char. Roof, IC, 14x20, 7 25 | Sheathing.....30c
Coke " IC, 14x20, 6 25 | **Lead.**—₩ lb
METALS. | Pig.....7½c
Pig Tin.—₩ lb., gold | Sheet & Pipe.....8 1-10c
Banca.....24c | **Zinc.**—Sheet..₩ lb 10½c
Straits.....19¾c | **Spelter.**—₩ lb 7½c
English.....19½c | **Antimony.** gold ₩ lb 13½c

ST. LOUIS.

Corrected weekly by Semple, Birge & Co.

Apple Parers.—Conqueror.....₩ doz. $7 75
Hudson's Rotary.....7 75
Axes.—Wm. Mann's, Red Warrior.....₩ doz. $11 50
Wm. Mann's, W. Stewart's.....12 00
" C Marshall....." 10 50
" Handled....." $5 extra
" Double Bitted....." 2 50
H. L. B. & Co.'s, L. & Co....." 11 50
" Pioneer....." 12 00
" James & Co....." 11 00
Hunt's.....13 00
Axles.—Jones, Henry & Co.'s" Patent Lubricating, Half Patent, Swelled Taper, Plain Taper and Concord Axles.....dis 10 & 5 %
Common Axles (Pat. Lubricating), 1½ inch and upward.....₩ lb. 6½c.
do. less than 1½ inch.....7 c.
Bellows.—Best St. Louis make...60c ₩ in. dis 40 & 2½ %
Bells.—Troy, Church, School and Farm Bells...₩ lb 44c
"Improved Amalgam Bronzed," 15 in., $3 00; 17 in., $4 00; 19 in., $6 00.....net
Belting.—"Boston Belting Co.'s Rubber.....dis 40 %
"Bradford & Sharp's" Oak-Tanned Leather.....dis 30 %
Bolts.—Arms, Bell & Co.'s Carriage & Tire...dis 70 & 10 %
Arms, Bell & Co.'s Machine.....dis 50 & 10 %
Butts.—Western Butt Co.'s new list—
Narrow Fast Joint.....dis 25 & 10 %
Broad Fast Joint.....dis 3 & 10 %
" Loose " .....dis 45 & 10 %
Reversible.....dis 40 & 10 %
" Japanned and Silver Tipped.....dis 45 & 10 %
Loose Joint "Acorn" " " " dis 45 & 10 %
Wheeling Hinge Co.'s W't Fast Joint Narrow.....dis 30 %
" " " Broad.....dis 35 %
" " Loose Joint.....dis 35 %
" " Reversible.....dis 35 %
" " Table & B'k Flaps.....30 %
Churns.—Julian, No. 3, $7 00; No. 5, $7 50; No. 4, $8 50.....dis 25 %
Cider Mills.—American Senior, $40 00; Am. Junior, $25 00.....dis 30 %
Corn Knives.—Dunn Edge Tool Co.'s Clip...₩ doz 5 00
Seymour Mfg. Co.'s Solid Steel Back....." 4 00
Corn Shellers.—Sandwich Mfg. Co.'s—
Power Shellers.....dis 10 %
Hand Shellers.....Special rates
Cotton Gins.—The Carver, 10 in. Saw, $4 a Saw...dis 15 %
12 in. Saw, $4 50 a Saw.....dis 10 %
Crow Bars.—Steel Pointed.....₩ lb 6½c
Drag Saw Machines.—
Culver's Iron Drag Saw.....dis 10 %
Robinson's Patent Sweepstakes Drag Saw.....dis 10

Fanning Mills.—Nash & Cutt's.....dis 30 %
Feed Cutters.—Improved Burdick National...dis 30 %
Sanford No. 1, $10 75; No. 4, $8 00.....net
Files.—Black Diamond, Mill.....$5 00 £ currency.
" " Bastard.....5 00 £ currency.
" " Taper.....5 00 £ currency.
Forges.—Keystone Portable Forge Co.'s.....dis 12½ %
Forks and Hoes.—
Auburn Mfg. Co.'s Hay and Manure Forks.....dis 30 %
" " Handled Hoes.....dis 30 %
Garden Seed Drills and Wheel Hoes.
Allen's Double Wheel Hoe.....dis 40 %
" Planet Drill, Nos. 2 and 3.....dis 15 %
" Combined Drill and Wheel Hoe.....dis 15 %
Grinding Mills.—Challenge Feed Mills.....dis 15 %
Sedgebeer's Nonpareil Mills.....dis 15 %
Hammers.—Masons' Hammers.....₩ lb 20c
Smiths' Hand.....20c
Handles.—No. 1 Fork, Hoe and Rake.....dis 20 %
No. 2 Fork, Hoe and Rake.....dis 40 %
Harrow Teeth.—1 inch iron.....₩ lb 4½c
⅞ and ¾ inch iron.....4¾c
Barbed or Headed.....½c extra
Hay and Cotton Presses.—
Dederick's Railroad.....net list
" Perpetual.....net list
Hay Knives.—
Dunn Edge Tool Co.'s.....₩ doz $15 00—dis 15 & 5 %
Lightning (Weymouth's Patent).....₩ doz $30 00
Hinges.—
Wheeling Hinge Co.'s Strap & T.....dis 33⅓ & 10 %
Horse Hay Fork.—Nellis' Harpoon.....dis 25 %
Horse Nails.—National Patent Polished.....20c rates
National Patent Polished, extra finished.....22c "
Horse Powers.—Pitts or Carey's Patent.....dis 10 %
Wheeler's Railway.....dis 10 %
Sandwich Lever.....dis 10 %
Horse Rakes.—Heller Bros.....dis 45 %
"Black Diamond".....$6 00 to the £ currency
Horse Shoes.—
Rhode Island (Perkin's Pattern).....₩ keg, $5 50
" Mule.....6 50
" Trotting Shoes....." 8 00
Tredegar Horse.....per keg $5 50
" Mule.....per keg 6 50
Hose.—
Boston Belting Co.'s Rubber Medium Sizes.dis 30 & 10 %
" " Small Sizes, Hydrant.....dis 40 %
Ice Tools.—W. I. Wood & Co.'s Saws.....new list net
W. I. Wood & Co.'s Chest Handles.....new list net
" " Axes.....new list net
" " Loading Tongs.....new list net
" " Medium, Small and Family Tongs.....new list net
" " Chisels, Hooks and Grapples.....new list net
Mattocks and Grub Hoes.—
Klein, Logan & Co.'s Mattocks..₩ doz $13 00 @ 18
" " Grub Hoes, oval eye.....10 00 @ 11 50
Money Drawers.—
Pierpont & Co.'s Excelsior.....per doz $40 00 net
Nails.—Wheeling.....$3 15 rates
Packing.—Boston Belting Co.'s Rubber, Plain..dis 30 %
Boston Belting Co.'s Rubber, Pure.....dis 25 & 5 %
" " No. 2 Plain.....dis 40 %
" " Round and Square....dis 10 & 10 %
Picks.—Klein, Logan & Co.'s Railroad and Clay.....₩ doz $9 30 @ 11 00
Klein, Logan & Co.'s Coal....." 7 45 @ 8 40
" " Pole....." 12 60 @ 15 30
" " Stone....." 14 40 @ 14 90
" " Tamping....." 14 70 @ 15 35
" " Miners' Drifting....." 10 25 @ 12 80
Plows.—Avery's Cast and Steel.....dis 20 %
Collins Cast Cast Steel.....new list net
Pekin Steel.....new list net
Post Hole Augers.—Clark's Patent—
No. 1, ₩ doz. $27; No. 2, $30; No. 3, $32.....dis 20 %
Pulleys.—5 inch.....per doz $4 25 net
4 inch.....per doz $3 25 net
Nellis' Patent.....new list dis 15 %
Pumps.
St. Louis, Farm, Patent Metal Lined...new list dis 50 %
Rakes.—Paddock's Premium Sulky.....$28 00 net.
St. Louis Revolving 14 tooth.....4 85 net.
" " 16 " .....4 90 net.
" Hand Hay Rake.....dis 20 %
Reaper Knives and Sections.—
Geo. Barnes & Co.'s Knives.....dis 25 %
" " Sections.....dis 40 %
Road Scrapers.—Steel.....dis 25 %
" " Cast Iron.....dis 10 & 5 %
Sad Irons.—Monitor Brand, Silver Polished..₩ lb 4½c
Sash Weights.—Standard Solid Eyes.....₩ lb 4c
Saws.—Curtis & Co.....dis 10 %
Scythes.—Dunn Edge Tool Co.'s.....new list dis. 20 & 5 %
Scythe Stones.—No. 1 Ind'n Pond ₩ gr's, $7 00
Extra Indian Pond....." 5 50
Premium....." 10 50
Diamond Grit....." 13 00
Shovels and Spades.—H. M. Myers & Co.....dis 30 %
Grain Scoops, Pat. Cor'd Straw H. M. & Co.....dis 30 %
" " M. Rowland & Co.....dis 30 %
" " O. Ames & Son.....dis 20 %
Sledges.—Smith's Stone or Coal Sledges—
Steel Face Polished.....₩ lb 18c
Solid Cast Steel....." 35c
Snaths and Cradles.—Seymour Mfg. Co.'s.....dis 20 %
Sorghum Machinery.—Ben Cane Mills.....dis 15 %
Scantlin's Seamless Evaporators.....dis 10 %
Springs.—Cleveland Spring Co.'s—
Carriage and Express.....dis 12½ %
Blue Seat Springs.....dis 15 %
Vises.—Solid Box.....₩ lb 16c
Wilson Mfg. Co.'s.....dis 15 %
Wheelbarrows.—Railroad & Garden....new list net
Wrenches.—Coes' Genuine.....dis 33⅓ & 5 %
Coes' Pattern.....dis 50
Wagons.—Whitewater Farm Wagons—
Thimble Skein.....No. 3, $74; 3½, $78; 3¾, $79
Iron Axle.....No. 1½, $75; 1¾, $81; 1¾, $88

St. Louis Metal Market.

(Corrected Weekly by Messrs. E. Sellew & Co.)

Tin Plate.

IC, 10x14, Best Char.	$ 9 50	IX, 14x20, Roofing	$11 50
IX, 10x14, "	12 00	IC, 20x28, "	19 00
IC, 12x12, "	10 00	IX, 20x28, "	23 50
IX, 12x12, "	12 50	IC, 10x14, Coke	8 50 @ 9 00
IC, 14x22, "	10 00	IC, 14x20, "	9 00
IX, 14x28, "	15 00	IC, 10x20, "	14 00
IC, 14x20, Roofing	9 00		

Usual differences for odd sizes.

Block Tin.

Large Pigs	29c	Bars	31c
Small "	30c		

Sheet Zinc.
Casks.....₩ lb 10½c | Sheet.....₩ lb 11c
Solder.
No. 1, Refined, in bars or plate.....16c
No. 2, " " " 15c
Pig Lead.....7½c
Sheet Copper—14 to 100 lbs., sheets 30x90.....41c
10 to 12 lbs., " and 30x72.....43c
6 to 9 lbs., " 46c
Tinned, 14 and 16 oz. 14x48.....22c
Planished, 14 and 16 oz. 14x48.....24c
" No. 7, 8 and 9.....41c
Copper Bottoms.....43c

Sheet Iron.

	Common.	Smooth.	Smooth Charcoal.	Smooth Juniata
No. 24	4½c	5½c	6¾c	8¾c
25 & 26	4½c	5¾c	7 c	9 c
27	4¾c	6 c	7½c	9¼c

Galvanized Iron......dis 30 %

No. 16 to 20	14c	No. 22	15c
21 to 24	17c	25	16c
25 & 26	14c		

Russia Iron.—
Perfect.....13c | No. 1 Stained.....16c
American Russia.—A.....14c | In sheets, 1c higher.
B.....11c
Lead.— | In sheets, 1c higher.
Pig.....7½c | Lead Pipe, in full coils.....8½c
Bar.....8½c | Lead Pipe, when cut.....9½c
Wire—Bright.....dis 25 | Sheet Lead.....9½c
Coppered.....dis 20

CHICAGO.

(Reported by Frank Sturges & Co., 72, 74 & 76 Lake St.)

September 15, 1875.

Tin Plate.—

10x14, IC, Ch'l. Good	$ 9 50	14x20, IX, Ch' Best	$13 00
10x14, IC, " Best	9 50	14x20, IXX, " "	15 50
10x14, IX, " "	12 00	DC, 100 Plate, " "	16 00
12x12, IC, " "	10 00	DX, " "	14 00
12x12, IX, " "	12 50	DXX, " "	14 50
14x20, IC, " "	10 00	DXXX, " "	17 00
Roofing IC, Charcoal, Best			9 00
Roofing IX, Charcoal			11 50
20x28, IC, Charcoal Roofing, Com			13 00
20x28, IC, "		Good	15 50
20x28, IC, "		Best	19 00
20x28, IX, "			25 00
10x14, IC, Coke Plates			8 50 to 9 75
14x20, IC, "			9 00 to 9 50
10x20, IC, "			14 00

Block Tin.—

Large Pigs	27c	Bars	29c
Small "	28c		

Zinc.—Sheet, 500 to 1000 lb. Casks.....10½c
Loose Sheets.....11c
Slab Zinc or Spelter.....7½c
Copper.—Bottoms.....44c
Sheathing.....34c
Planished.....36c
" Boiler lengths.....41c
Ingot.....—
Bolt.....33c
Braziers' Sheets.—
20x60, 6 & 7 lbs.....₩ lb 39c | 30x60, 10 & 12 lbs...₩ lb 38c
30x60, 8 & 9 lbs.....37c | 30x60, 15 to 100 lbs.....32c
Solder.—F. S. & Co.'s make.
Best Fine.....20c
No. 1.....19c
Roofing.

TO ALL WHO USE STEAM-POWER!

We will put our Governor on any Engine, and guarantee it to prove itself superior to all others.

If, after a fair trial, it does not, we will take it off at our own expense.

ShiveGovernorCo

BETHLEHEM, PA.

ALSO,

SHIVE'S PATENT WATCHMAN'S CLOCK AND DETECTOR,

AND

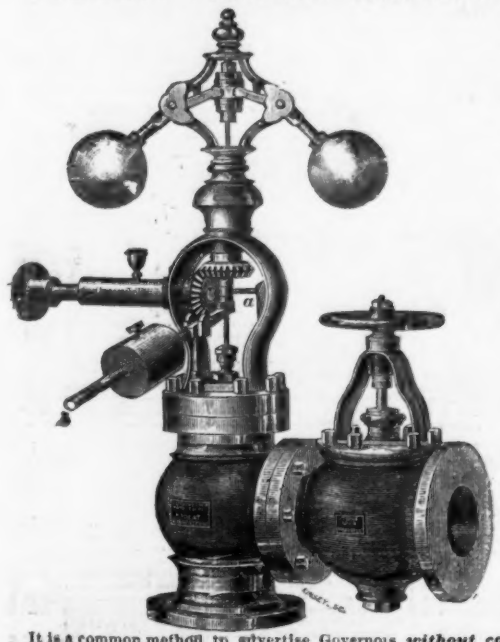
Buoy's Patent Counter Scale,

No Nest of Weights.

Circulars sent free

February 10, 1875. REDUCED PRICE LIST OF THE

JUDSON PATENT IMPROVED GOVERNORS.



☞ When Governors are ordered, be particular and say Governor with Stop Valve, or without Stop Valve; and either Black, Finished or Portable, as you may require, and with or without Lever Attachment.

For dimensions and other particulars send for Illustrated List.

Capacity of Valve or Diameter of Steam Pipe in inches.	Price, Black.	Price, Bright Finish.	Price, Portable.	Price of Lever Attachment for altering speed.	Price of Stop Valve.
¾	18·00	20·00	17·00	..	..
⅞	20·00	22·00	19·00	..	..
1	24·00	27·00	22·00	2·00	5·25
1¼	29·00	32·00	27·00	2·25	6·64
1½	34·00	38·00	31·00	2·50	8·50
2	41·00	46·00	38·00	2·75	11·50
2¼	47·00	54·00	..	3·25	16·00
2½	50·00	57·00	47·00	3·50	17·00
2¾	55·00	62·00	No Larger Portable made than 2½ in.	3·75	19·00
3	62·00	70·00		4·25	22·00
3½	71·00	80·00		4·50	27·00
4	81·00	92·00		5·00	32·00
4½	91·00	103·00		5·50	37·00
5	102·00	114·00		6·00	42·00
5½	116·00	129·00		6·50	48·00
6	134·00	148·00		7·00	55·00
7	160·00	176·00		8·00	69·00
8	199·00	219·00		9·00	83·00
9	230·00	255·00		10·00	..

No Charge for Boxing & Cartage.

It is a common method to advertise Governors *without cost*, unless satisfactory to the customer, and then charge *High Prices* for doing what any good Governor will do. Various Governors inferior to the "Judson" are sold in this way, operating well enough for three months, to insure collection of the pay, but becoming useless after a year's wear—their construction lacking durability. The Judson Governor is guaranteed to be not only the best Regulator of Steam Engines, but also the most durable Governor made. Parties in buying other Governors should stipulate that their durability be guaranteed, and should also take care that they do not, for much inferior Governors, pay higher prices than those shown in the above list. We guarantee the Judson Governor will do all any other Governor can do, and in Accuracy and Durability—the main essentials—we guarantee it shall do more.

JUNIUS JUDSON & SON, Rochester, N. Y.

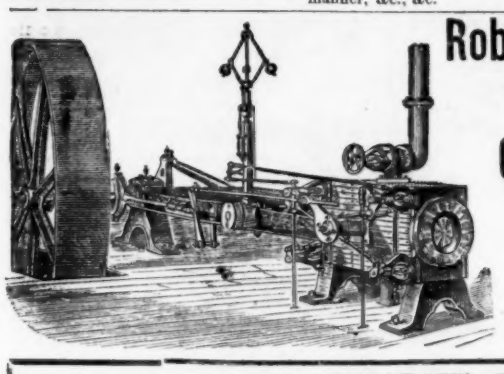
The Pratt & Whitney Co.,

Hartford, Conn.,

Have constantly on hand and making

Drop Hammers

Of recently Improved Construction. Pony Trip Hammers, Blacksmiths' Sheaves, Broaching and Stamping Presses, Iron Shop Cranes, Machinists' Tools, Gun and Sewing Machine Machinery. Make to order Gray and Charcoal Iron Castings of all styles and sizes not exceeding 15 tons weight, (making patterns if desired). Furnish Clamp Pulleys of light patterns, cut gears in a superior manner, &c., &c.



Robt. Wetherill & Co

CHESTER, PA.

Corliss Engine BUILDERS

AND

Boiler Makers.

THORNE, DeHAVEN & CO.

21st Street, above Market,
PHILADELPHIA.

DRILLING MACHINES.

PORTABLE DRILLS. Driven by power in any direction, self-feed and convenient adjustment.

RADIAL DRILLS. Self-feed—large adjustable box table—separate base plate, every convenience.

VERTICAL DRILLS. Self-feeding—of new and improved designs.

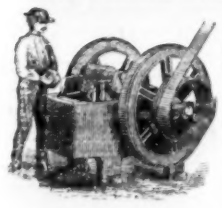
MULTIPLE DRILLS. For boiler work, etc., 2 to 20 spindles, fed and returned by power or hand, together or separately.

HORIZONTAL BORING AND DRILLING MACHINES. For large pieces—with boring head, adjustable, vertically and horizontally.

SPECIAL DRILLS. For special work. Gun Blank Drills, Coal Drills, &c., built to order.

BLAKE'S PATENT
STONE & ORE BREAKER.

New Pattern with Important Improvements & Abundant Strength



For reducing to fragments all kinds of hard and brittle substances, such as STONE for making the most perfect McADAM ROADS, and for making the best CONCRETE. It breaks stone at trifling cost for BALLASTING RAILROADS It is extensively in use in MINING operations, for crushing

IRON, COPPER, ZINC, SILVER, GOLD, and other ORES.

Also for crushing **Quartz, Flint, Emery, Corundum, Feldspar, Coal, Barytes, Manganese, Phosphate Rock, Plaster, Soapstone, &c.**

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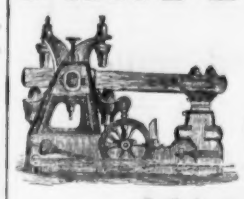
BLAKE CRUSHER CO., New Haven, Conn.

BRADLEY'S CUSHIONED HAMMER



Has Larger Capacity,

Is More Durable, takes up Less Room, does More and Better Work with less expense for Power and Repairs than any other Hammer in use.

GUARANTEED as RECOMMENDED.

Address, BRADLEY MANUFACTURING CO., Syracuse, N. Y.

Knowles Patent Steam Pumps

MANUFACTURED BY THE

KNOWLES STEAM PUMP WORKS,

WARREN, MASS.

WAREHOUSES:

14 & 16 Federal Street, Boston, 92 & 94 Liberty Street, N. Y.

Cut above represents regular Boiler Feed Pump, No. 3 and 4. Showing New Patent Valve Motion, and Hand Power LEVER Attached and Detached.

FIRE PUMPS, a specialty.

Mining Pumps (both Double Acting Plunger, and Piston Pattern,) which we guarantee to run absolutely noiseless on any lift from 100 to 600 ft., at a single lift, a specialty. Pumps for every possible duty. Prices as low as any, and our workmanship and material altogether the Best.

Every machine furnished under a complete guarantee.

Morse Twist Drill and Machine Company,

New Bedford, Mass.

Sole Manufacturers of

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Beach's Patent Self-Centering Chuck.

Also Manufacture **Patent Taps and Dies, Patent Screw Plates, Patent Tap Wrenches, Pipe Taps and Pipe Reamers, Gas Dies.**

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All Tools exact to Whitworth's Standard Gauge.

Drills made to fit any Socket desired.

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Patent Planers and Shaping Machines.

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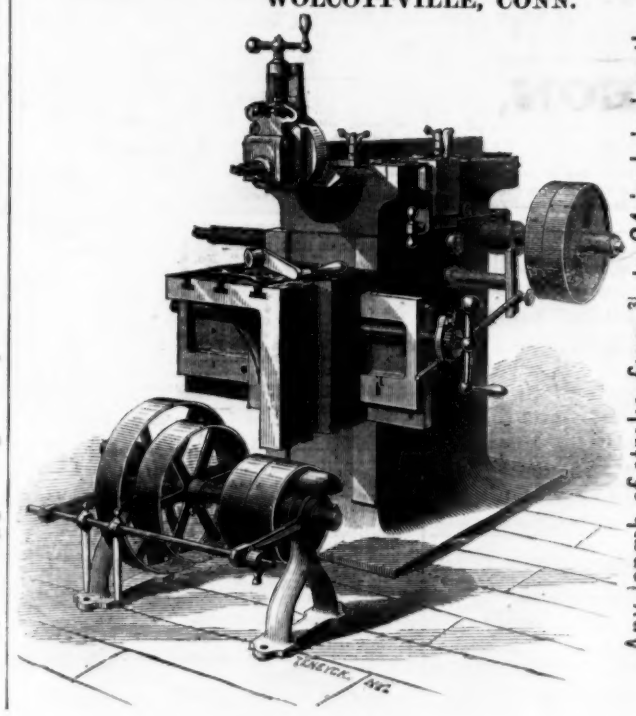

Any length of stroke from ¾ to 24 inch in length, while machine is running with perfect uniformity of speed of cutting tool. Automatic cross feed of 19 inch and 16 inch, from top of table to bottom of slide when table is down. Send for Circular and Price List.

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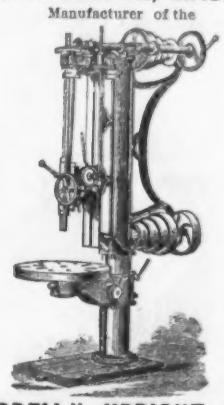

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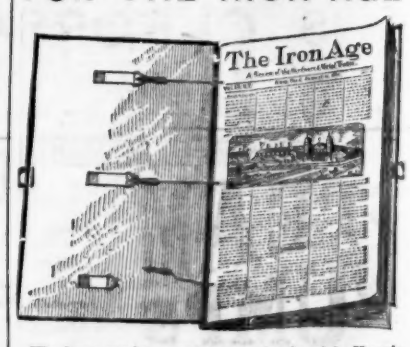

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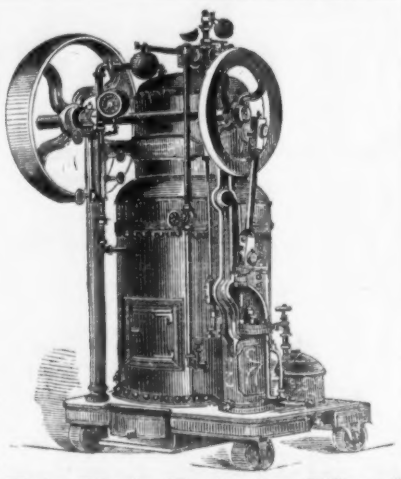

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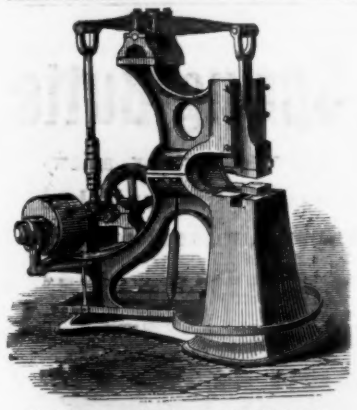

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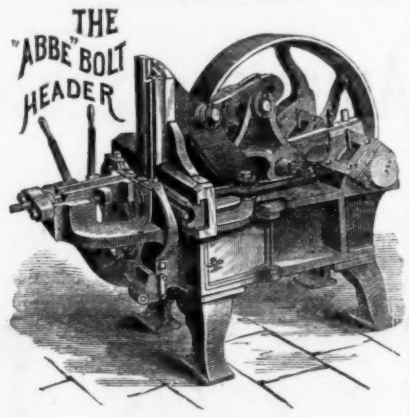

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With or without Convex and Concave Washers.

Jackscrews, Braces, Coffee Mills, Turning Lathes, Clamp Heads and Screws; Parallel Bench Vises, Sash Pullies, Hoe, House Pullies, Composition Cocks, Bench Screws, Vise Screws, Gridirons, Drill Stocks and Bows, Box Chisels, Rivets, Sheaves, Block Pins, Composition Roller and Iron Bushings, Riggers' Screws, Caulkers' Tools, Pump Chambers, Belaying Pins, Marlin Spikes, Malleable Iron Castings, and General Hardware.

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ROLLER TUBE EXPANDERS

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Communications by letter will receive prompt attention.

JACKS for Pressing on Car Wheels or CRANK PINS made to order

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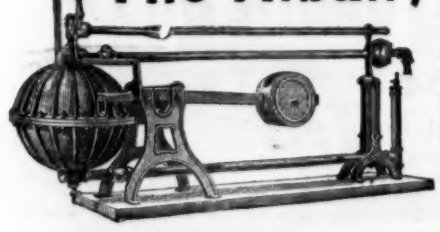

This Trap automatically drains the water of condensation from *Heating Coils*, and returns it to the Boiler *whether* the Coils are *above or below* the water level in Boiler, thus doing away with pumps and other mechanical devices for such purposes. Apply to

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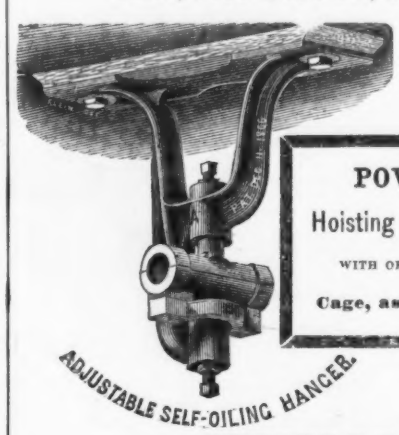

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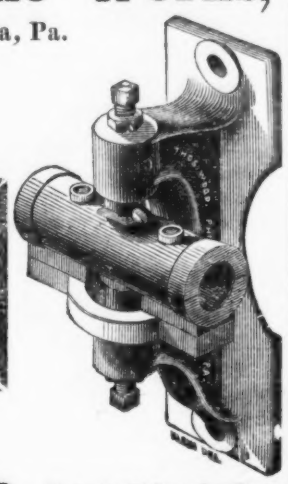

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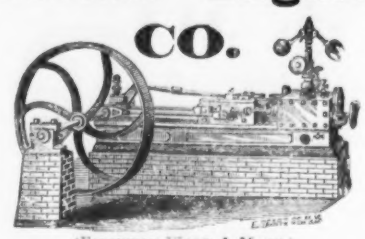

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STEAM ENGINES,

The best and Most Complete Assortment in the Market.

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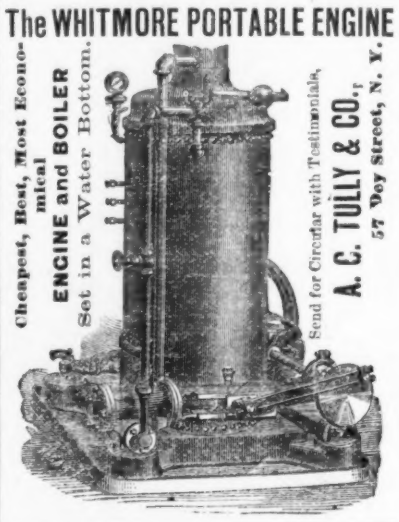
Cheapest, Best, Most Economical ENGINE and BOILER Set in a Water Bottom.



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Superior to any other Light for Mining Purposes. Manufactured by

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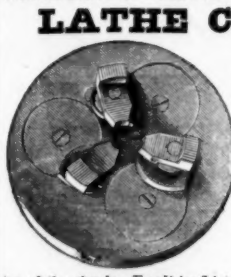
JOHNSON'S PATENT UNIVERSAL LATHE CHUCK.



We invite attention to the superior construction of this chuck. Its working parts are **absolutely protected from dirt and chips.** It is strong, compact and durable, and will hold the greatest variety of work, as the jaws are adjustable with a range the full diameter of the chuck. For Price List address,

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Sole makers of the
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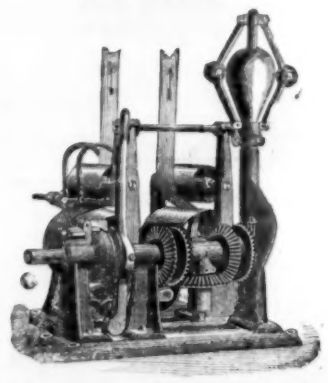
FOR WATER.



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XXX Genuine	40c	C	20c
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"Note."—The above are my standard mixtures, and have given satisfaction wherever used, but I am prepared to make Anti-Friction Metal of any quality or mixture desired by the purchaser.

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LARGE DRAWER ALWAYS SECURE.

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Great Reduction in Time and Labor to the Farmer by using

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Grapple and Pulleys; also, Nellis' Patent Stacker and Method of conveying Hay, Straw, &c. A ton of Hay can be delivered in three to five minutes to any part of Mow or Stack. The right of Stacker and Conveyer granted FREE to the Farmer purchasing our Horse Hay Fork and Fixtures during season of 1875.

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Steel Tempered by Nellis' process to suit every kind of soil.

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No. 54 & 56 Fulton, and
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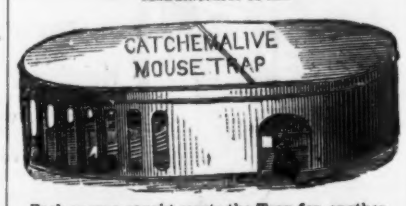

Each mouse caught resets the Trap for another.

TUBULAR

And Other

Patent Lanterns

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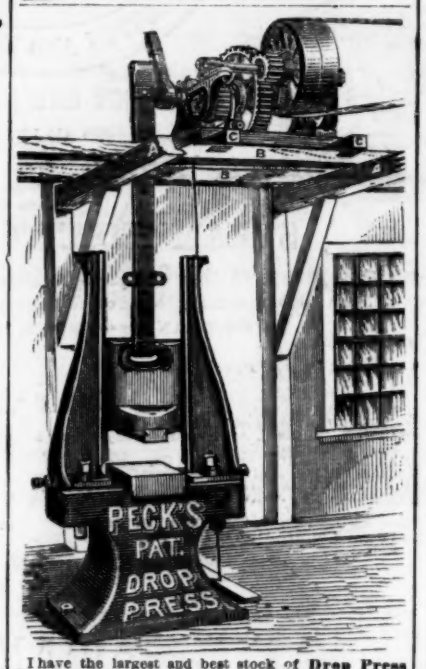

I have the largest and best stock of **Drop Press Patterns** in the country—suitable for Forging, and all kinds of Sheet Metal work.

WHY THE BEST:

It requires less power, works faster, gives a harder blow with same weight of hammer, the rebound of the hammer is caught without lessening the force of the blow, the blow is uniform and not affected by variations in the speed of the driver. It is always in order. **The Drop Press a specialty.**

MILO PECK, New Haven, Conn.

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Equal to any made, in great variety, all of our own manufacture.

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Brass Works,
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Manufacturer of **Brass Work for Water, Gas and Steam.** Brass Castings and Jobbing promptly attended

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Put up in Boxes containing 5, 10, 25 and 50 lbs. and in barrels of 200 lbs.

This article is prepared with great care, has more body than that prepared by any other party, and is as near perfect as possible.

We were the first manufacturers to put up Plumbago as a Lubricator; and the experience of years has shown that it will save more than half the expense of oil or grease, will absolutely cool off a hot journal, and save nearly all the wear, the axles or shafts being glazed over with it, and running almost without wear. A car axle will run four or five times as long if our Lubricating Plumbago is used freely. A second-class article, however, is worse than none, because it contains a grit that will wear both the shaft and the box.

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It is pure, very finely pulverized, is free from grit, and is prepared by the most expert manufacturers of **PLUMBAGO GOODS** in the world. Send for envelope sample.

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Carriage Bolts made from Best Square Iron, a Specialty.

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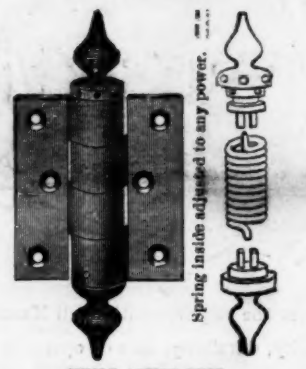

SINGLE ACTION BUTT, SWINGS DOOR ONE WAY.

Swing doors either way, allowing continual passing, and close them promptly, without noise.

Invaluable in cold weather, and in summer can be used as ordinary hinge

Very Desirable FOR Stores, Banks & Churches, AND ALL Outside Winter Doors.

Used on the

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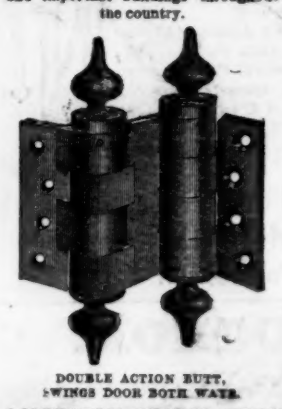

DOUBLE ACTION BUTT, SWINGS DOOR BOTH WAYS.

Noiseless Double Action Butt, as seen upon a door, swinging it both ways.

PRICE LIST OF MAY 1st, 1875.

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4 in. No. 5, ₩ pair	$ 4 00		3 in. No. 45, ₩ pair	$ [illegible]
5 " 11, "	3 00		4 " 50, "	[illegible]
6 " 16, "	4 00		5 " 52, "	[illegible]
7 " 22, "	5 00		7 " 55, "	[illegible]
8 " 28, "	6 50		8 " 58, "	[illegible]
10 " 30, "	8 00		10 " 59, "	[illegible]
10 " 31, "	8 50		10 " 60, "	[illegible]
12 " 38, "	10 00		12 " 63, "	[illegible]

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